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*North Carolina Department of Transportation
Statewide Planning Branch
Systems Planning Unit*

Thoroughfare Plan for the



1992

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**THOROUGHFARE PLAN
FOR THE
TOWN OF AYDEN, NORTH CAROLINA**

Prepared by the:

Statewide Planning Branch
Division of Highways
N. C. Department of Transportation

In cooperation with:

The Town of Ayden
The Federal Highway Administration
U. S. Department of Transportation

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CONTENTS

1.	Introduction	1.1
2.	Thoroughfare Planning Principles	2.1
	Objectives	2.1
	Operational Efficiency	2.2
	System Efficiency	2.3
	Functional Classification	2.3
	Idealized Major Thoroughfare System	2.4
	Application of Thoroughfare Planning Principles	2.7
3.	Existing and Projected Conditions	3.1
	Population Trends	3.1
	Employment and Economic Trends	3.2
	Land Use Trends	3.3
	Vehicle Registration Trends	3.4
	Traffic Accidents	3.4
	Travel Demand	3.6
4.	Development of the Thoroughfare Plan	4.1
	Capacity Analysis	4.1
	System Deficiencies	4.5
	Environmental Considerations	4.6
	Wetlands	4.6
	Threatened and Endangered Species	4.7
	Historic Sites	4.8
	Air and Noise Pollution	4.9
5.	Municipal and Public Involvement	5.1
6.	Recommendations	6.1
	Major Thoroughfares	6.1
	Minor Thoroughfares	6.3
	Other Projects	6.4
7.	Construction Priorities, User Benefits, and Cost Estimates	7.1
8.	Implementation	8.1
	Mutual Adoption of the Thoroughfare Plan	8.1
	Subdivision Regulations	8.2
	Zoning Ordinances	8.2
	Future Street Lines	8.3
	Official Maps	8.4
	Urban Renewal	8.4
	Capital Improvements Programs	8.5
	Development Reviews	8.5
	Other Funding Sources	8.5



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Appendix A.	Typical Thoroughfare Cross Sections	A.1
Appendix B.	Street Inventory and Recommendations	B.1
Appendix C.	Area Thoroughfare Plans	C.1
Appendix D.	Recommended Subdivision Ordinances	D.1
	Definitions	D.1
	Design Standards	D.3

FIGURES

1.	Geographic Location of Ayden	1.3
2.	Idealized Thoroughfare Plan	2.5
3.	Persons Per Vehicle Trends in Pitt County and North Carolina	3.5
4.	Average Daily Traffic at selected locations	3.7
5.	Levels of Service	4.3
6.	Wetlands in the Winterville/Ayden area	4.11
7.	Ayden Thoroughfare Plan	6.5
8.	Construction Priorities	7.7
A-1.	Typical Thoroughfare Cross Sections	A.3
C-1.	Greenville Thoroughfare Plan	C.1
C-2.	Winterville Thoroughfare Plan	C.3

TABLES

1.	Population Trends and Projections	3.2
2.	Employment Trends in Pitt County	3.3
2-A.	Farm versus Non-farm Employment	3.3
3.	Intersections with 5 or More Accidents	3.6
4.	Probability Estimation Guide	7.1
5.	Environmental Considerations	7.2
6.	Benefits Analysis and Construction Priorities	7.5
B-1.	Street Inventory and Recommendations	B.2
D-1.	Design Speeds	D.6
D-2.	Maximum Vertical Grade	D.7
D-3.	Sight Distance	D.8
D-4.	Superelevation Table	D.9

1. INTRODUCTION

Transportation has played an integral role in the development of Ayden. As a growing suburb of Greenville (see Figure 1), travel between the two areas has become more extensive. The need for improved transportation facilities has grown accordingly. This report identifies the recommended street and highway improvements that are necessary in the Ayden area to meet transportation needs during the planning period from 1990-2015.

There are many benefits to be derived from thoroughfare planning. The primary objective is to enable the urban street system to be progressively developed to serve future traffic demands in the Ayden area. In addition, the system of thoroughfares should be developed based on the principles of thoroughfare planning as discussed in Chapter II.

A preliminary thoroughfare plan for the Town of Ayden was developed in 1978. This plan was a cooperative effort between the Town, the Mid-East Economic Development Commission, and the Planning and Research Branch of the North Carolina Department of Transportation. It was adopted by the Town of Ayden on October 9, 1978, and by the North Carolina Board of Transportation on November 10, 1978. A revision to this plan was mutually adopted in late-1980.

On September 6, 1989, the Town of Ayden formally requested an update of their thoroughfare plan. Due to the growth and development in the region and recent federal legislation regarding the environment, several of the proposed thoroughfares on the existing plan had become infeasible. Also, since the Town was working with the North Carolina Department of Economic and Community Development on an updated Land Use Plan, a review of the thoroughfare plan seemed appropriate.

Because of growth in the area, Ayden's planning boundaries were expanded to include additional area on the outskirts of town. The northern planning boundary is now shared with the Town of Winterville and is located along Reedy Branch Road. An update of Winterville's thoroughfare plan is being studied concurrently with Ayden's plan. Every effort was made to provide the most efficient interconnected network of roadways between these two municipalities.

The purpose of this report is to document the 1990-1992 study findings and recommendations. Included are recommendations for thoroughfare cross sections, cost estimates for recommended improvements, an evaluation of benefits to be gained from improvements, and recommendations for plan implementation. It should be emphasized that the recommended plan is based on the anticipated growth of the area as indicated by current trends. Prior to the construction of specific projects, a more detailed study will be required to assess the differences between the projected and actual conditions in Ayden and to determine the specific locations and design requirements for each project.

Some of the improvements proposed in this report will be the responsibility of the North Carolina Department of Transportation while others will be the responsibility of the Town. For optimum benefit, improvements made by the State need to be closely coordinated with those made by the Town. To ensure coordination, the plan was formally adopted by the Town of Ayden and the North Carolina Department of Transportation as an official guide for the development of the future transportation system. The next step is to execute a system responsibility agreement designating which thoroughfares will be the responsibility of the State and which will be the responsibility of the Town.

GEOGRAPHIC LOCATION

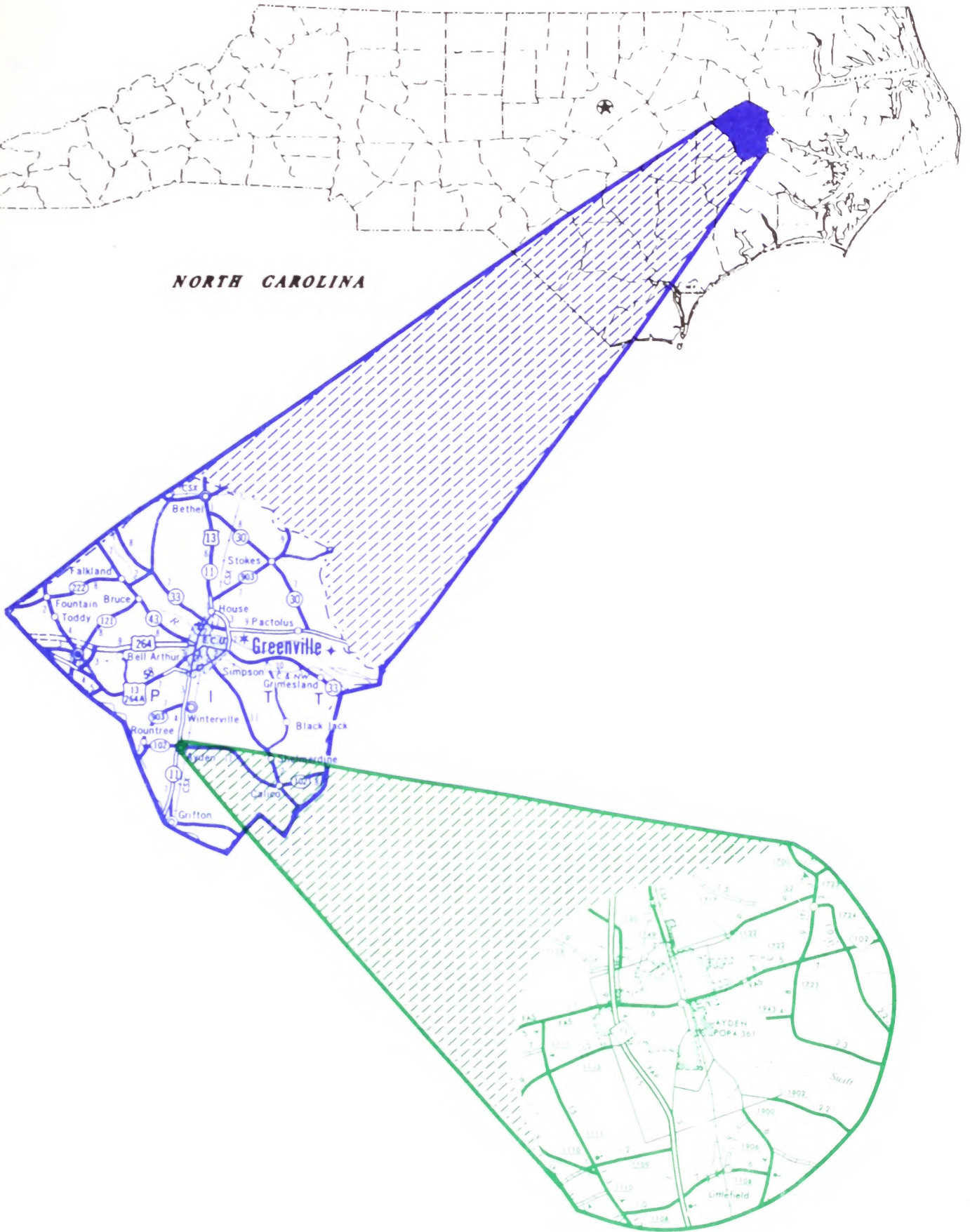


FIGURE 1

2. THOROUGHFARE PLANNING PRINCIPLES

Objectives

Typically, the urban street system occupies 25 to 30 percent of the total developed land in an urban area. Since the system is permanent and expensive to build and maintain, much care and foresight are needed in its development. Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system to meet existing and future travel desires within the urban area.

The primary aim of a thoroughfare plan is to guide the development of the urban street system in a manner consistent with the changing traffic patterns. A thoroughfare plan will enable street improvements to be made as traffic demands increase. It will also help eliminate unnecessary improvements, so that needless expense can be averted. By developing the urban street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained, requiring a minimum amount of land for street purposes. In addition to providing for traffic needs, the thoroughfare plan should embody those details of good urban planning necessary to present a pleasing and efficient urban community. The location of present and future residential, commercial, and industrial development affects major street and highway locations. Conversely, the location of major streets and highways within the urban area will influence the urban development pattern.

Other objectives of a thoroughfare plan include:

- (1) providing for the orderly development of an adequate major street system as land development occurs;
- (2) reducing travel and transportation costs;
- (3) reducing the cost of major street improvements to the public through the coordination of the street system with private action;
- (4) enabling private interests to plan their actions, improvements, and development with full knowledge of public intent;
- (5) minimizing the disruption and displacement of people and businesses through long-range advance planning for major street improvements;
- (6) reducing environmental impacts, such as air pollution, resulting from transportation; and
- (7) increasing travel safety.

Thoroughfare planning objectives are achieved by both improving the operational efficiency of thoroughfares and by improving the system efficiency through system coordination and layout.

Operational Efficiency

A street's operational efficiency is improved by increasing the capability of the street to carry more vehicular traffic and people. In terms of vehicular traffic, a street's capacity is defined by the maximum number of vehicles which can pass a given point on a roadway during a given time period under prevailing roadway and traffic conditions. Capacity is affected by the physical features of the roadway, nature of traffic, and weather.

One way to improve the vehicular capacity of a street is through physical modifications, including street widening, intersection improvements, improvements to the vertical and horizontal alignment, and the elimination of roadside obstacles. For example, widening a street from two to four lanes more than doubles the capacity of the street by providing additional maneuverability for traffic. This reduces the impedances to traffic flow caused by slow moving or turning vehicles and the adverse effects of horizontal and vertical alignments.

Another method for improving the operational efficiency of a street, thus increasing its capacity, is through traffic and land use control measures. This includes:

- (1) **Control of access** -- A roadway with complete access control can often carry three times the traffic handled by a uncontrolled access street with identical lane width and number.
- (2) **Parking removal** -- An increase in capacity can be realized by removing on-street parking. This provides additional street width for traffic flow and reduces the friction to traffic flow caused by parking vehicles.
- (3) **One-way operation** -- The capacity of a street can sometimes be increased 20-50%, depending upon turning movements and overall street width, by initiating one-way traffic operations. One-way streets can also improve traffic flow by decreasing potential traffic conflicts and simplifying traffic signal coordination.
- (4) **Reversible lanes** -- Reversible traffic lanes may be used to increase street capacity in situations where heavy directional flows occur during peak periods.
- (5) **Signal phasing and coordination** -- Coordinated signals and proper signal phasing allow for smoother traffic flow and reduce excessive stop-and-go operation.

Altering travel demand is a third way to improve the efficiency of existing streets. Travel demand can be reduced or altered in the following ways:

- (1) encouraging people to form car pools and van pools for journeys to work and other trip purposes -- this reduces the number of vehicles on the roadway and raises the people-carrying capability of the street system;
- (2) encouraging the use of transit and bicycle modes;
- (3) encouraging industries, businesses, and institutions to stagger work hours or establish variable work hours for employees -- this will spread peak travel over a longer time period and thus reduce peak hour demand;
- (4) planning and encouraging land use development or redevelopment in a more travel efficient manner;
- (5) and developing a more efficient system of streets to better serve the travel desires of the public. The development of an improved street system is one of the primary objectives of the thoroughfare plan and will be discussed below in more detail.

System Efficiency

An efficient transportation system can minimize travel distances, time, and cost to the user. Improvements in system efficiency can be achieved through the concept of functional classification of streets and development of a coordinated major street system.

Functional Classification

Streets perform two primary functions -- traffic service and land service -- which, when combined, are basically incompatible. This conflict is not serious if both traffic and land service demands are low. However, when traffic volumes are high, conflicts created by uncontrolled and intensely used abutting property lead to intolerable traffic flow friction and congestion.

The underlying concept of the thoroughfare plan is that it provides a functional system of streets which permits travel from origins to destinations with directness, ease, and safety. Different streets in the system are designed and called on to perform specific functions, thus minimizing the traffic and land service conflict. Streets are categorized by function as local access streets, minor thoroughfares, or major thoroughfares.

Local Access Streets provide access to abutting property. They are not intended to carry heavy volumes of traffic and should be located so that only traffic with origins and destinations on these streets would be served. Local streets may be further classified as either residential, commercial, and/or industrial depending upon the type of land use which they serve.

Minor Thoroughfares are more important streets on the city system. They collect traffic from local access streets and carry it to the major thoroughfares. They may in some instances supplement the major thoroughfare system by facilitating minor through-traffic movements. A third function that may be performed is that of providing access to abutting property. They should be designed to serve limited areas so that their development as major thoroughfares will be prevented.

Major Thoroughfares are the primary traffic arteries of the city. Their function is to move intra-city and inter-city traffic. The streets which comprise the major thoroughfare system may also serve abutting property; however, their principal function is to carry traffic. They should not be bordered by uncontrolled strip development because such development significantly lowers the capacity of the thoroughfare. In addition, each driveway is a danger and an impediment to traffic flow. Major thoroughfares may range from two-lane streets carrying minor traffic volumes to major expressways with four or more traffic lanes. Parking normally should not be permitted here.

Idealized Major Thoroughfare System

A coordinated system of major thoroughfares forms the basic framework of the urban street system. A major thoroughfare system which is very adaptable to desire lines of travel within an urban area is the radial-loop system. It permits movement between various areas of the city with maximum directness. This system consists of several functional elements: radial streets, cross-town streets, loop system streets, and bypasses (Figure 2).

Radial streets provide for traffic movement between points located on the outskirts of the city and the central area. This is a major traffic movement in most cities, and the economic strength of the central business district depends upon the adequacy of this type of thoroughfare.

If all radial streets crossed in the central area, an intolerable congestion problem would result. To avoid this problem, it is very important to have a system of **cross-town streets** that form a loop around the central business district. This system allows traffic moving from one side of the central area to the other to follow the area's perimeter. It also allows central area traffic to circle and then re-enter the central area nearer to a given destination. The effect of a good cross-town system is to free the central area of cross-town traffic, thus permitting the central area to function more adequately in its role as a business or pedestrian shopping area.

IDEALIZED THOROUGHFARE PLAN

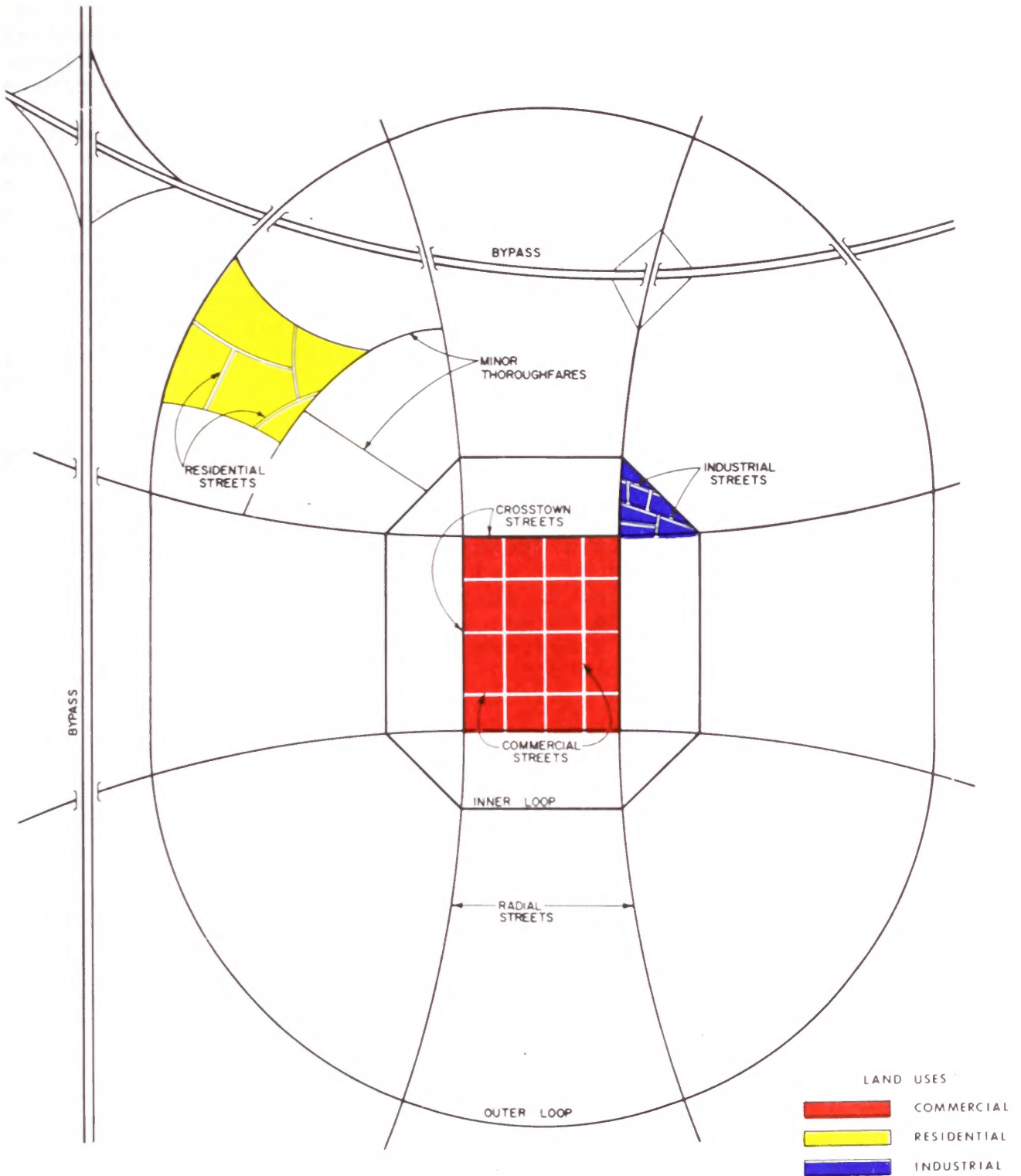


FIGURE 2

Loop system streets move traffic between suburban areas of the city. Although a loop may completely encircle the city, a typical trip may be from an origin near a radial thoroughfare to a destination near another radial thoroughfare. Loop streets do not necessarily carry heavy volumes of traffic, but they function to help relieve central area congestion. There may be one or more loops, depending on the size of the urban area. They are generally spaced one-half mile to one mile apart, depending on the intensity of land use.

A **bypass** is designed to carry traffic through or around the urban area, thus providing relief to the city street system by removing traffic which has no desire to be in the city. Bypasses are usually designed to through-highway standards, with control of access. Occasionally, a bypass with low traffic volume can be designed to function as a portion of an urban loop. The general effect of bypasses is to expedite the movement of through traffic and to improve traffic conditions within the city. By freeing the local streets for use by shopping and home-to-work traffic, bypasses tend to increase the economic vitality of the local area.

Application of Thoroughfare Planning Principles

The concepts presented in the discussion of operational efficiency, functional classification, and idealized major thoroughfare system are the conceptual tools available to the transportation planner in developing a thoroughfare plan. In actual practice, a thoroughfare plan is developed for established urban areas and is constrained by the existing land use and street patterns, existing public attitudes and goals, and current expectations of future land use. Compromises must be made because of these constraints and the many other factors that affect major street locations.

Throughout the thoroughfare planning process, it is necessary from a practical standpoint to follow certain basic principles as closely as possible. These principles are as follows:

- (1) The plan should be derived from a thorough knowledge of today's travel - its component parts, as well as the factors that contribute to it, limit it, and modify it.
- (2) Traffic demands must be sufficient to warrant the designation and development of each major street. The thoroughfare plan should be designed to accommodate a large portion of all major traffic movements on relatively few streets.
- (3) The plan should conform to and provide for the land development of the area.

- (4) Certain considerations must be given to urban development beyond the current planning period. In outlying or sparsely developed areas that have development potential, it is necessary to designate thoroughfares on a long-range planning basis to protect rights-of-way for future thoroughfare development.
- (5) While being consistent with the above principles and realistic in terms of travel trends, the plan must be economically feasible.

By adhering to these principles, the thoroughfare plan will encourage economic growth in an area by providing an efficient, cost effective transportation system with a minimal disruption to the physical, social, and economic environments.

3. EXISTING AND PROJECTED CONDITIONS

The Town of Ayden is located along NC 11 in southwestern Pitt County, just to the south of the Town of Winterville and the City of Greenville. NC 11 is the primary north-south transportation facility in the county and is the principal connector between the cities of Greenville and Kinston. Within the Ayden planning area, NC 11 is a four lane, partially controlled-access expressway with intersections at the major cross roads. It is the most heavily travelled roadway in the area and traffic volumes here are growing due to the alluring suburban lifestyle of the town. Ayden is also served by NC 102, which runs east toward US 17 and west toward US 13 and Goldsboro. Outside of Ayden, NC 102 is a two lane roadway with sparse residential and agricultural development on either side. Inside the Town Limits, NC 102 is the principal east-west thoroughfare, carrying high volumes of traffic and serving both the downtown area and the commercial/retail area in western Ayden.

In addition to the State highways, the area is also served by several important secondary roads, including Old NC 11, also known as Lee Street (SR 1149), which travels north and south through the downtown area, and Weyerhauser Road (SR 1900), which runs south toward the manufacturing plant of the same name. These roadways act as additional connections between the residential areas of Ayden and the major employment centers to the north and south. For this reason, they often carry heavy traffic loads during the morning and afternoon rush hours.

To fulfill the objectives of an adequate 25-year thoroughfare plan, reliable forecasts of future travel characteristics must be made. Such forecasts are possible only when the following major items are carefully analyzed: (1) historic and potential population changes; (2) significant trends in the economy; (3) the character and intensity of land development; and (4) motor vehicle registration and use. With this information, as well as with input from local planners, citizens, and public officials, the transportation engineer can determine the needs of the area and set out to solve the problems that have been identified.

Population Trends

Travel is directly related to population. Population trends and projections for the Town of Ayden, Ayden Township, and Pitt County are given in Table 1. The projections were derived from Census figures and extrapolated to the year 2015 using data provided by the Demographics Unit of the Office of State Budget and Management. As shown, the population in this area has been growing steadily over the past two decades. This is due in part to the availability of land in the area and Ayden's proximity to Greenville. This trend is expected to continue well into the next century.

The population in this area is projected to grow more quickly over the next 25 years than in past decades, adding to the congestion on the existing road network. In addition, this congestion will be compounded by the continued growth of nearby communities, including Winterville and Grifton, that use the roads through Ayden to access other area communities.

TABLE 1			
Population Trends and Projections			
Year	Pitt County	Ayden Twp.	Ayden
1940	61,244	5,599	1,884
1950	63,789	5,628	2,282
1960	69,942	5,281	3,108
1970	73,900	5,444	3,450
1980	90,146	6,156	4,361
1990	107,924	6,677	4,740
2000	* 128,535	** 7,390	***
2010	* 148,263	** 8,150	***
2015	* 157,531	** 8,430	***

* County population projections from Office of State Budget and Management, State of North Carolina.
 ** Township population projections based on trends related to County growth.
 *** Town population projections not given due to unforeseeable changes, such as annexations.

Employment and Economic Trends

The number of persons residing in any given area is a direct function of the number of jobs available in that area. For example, a decision by a large firm to build an industrial plant employing several hundred people would have an abrupt impact on an area's economy. This is because it would provide a new incentive for people to move into that area. Secondary spin-offs of such a decision would include: an increased demand for new housing and services; increased retail sales and bank deposits; increased school enrollment; increased traffic; and several other benefits and costs associated with urban population growth.

Since it is impossible to predict decisions such as new industrial plant locations in advance of their occurrence, long range projections of population and employment growth are somewhat "iffy." Historically, planners have relied upon the analysis of past trends to arrive at predictions of future ones. However, significant variances in predicted versus actual growth should be taken into account during periodic updates of this study in the future.

According to the figures shown in Table 2, employment in Pitt County has almost doubled over the past two decades. However, as shown in Table 2-A, this was accompanied by a substantial decrease in farm industry employment, indicating that an urbanization process is occurring in this county. This may also indicate that a larger percentage of the employed persons in Pitt County are traveling to and from a non-home-based workplace during the morning and afternoon rush hours, putting a larger strain on the road system now than in past years.

TABLE 2

Employment Trends in Pitt County *

Year	Total Employ.	Farm Employ.	Non-farm Employment		
			Total	Private	Gov't
1970	32,116	6,605	25,511	19,851	5,660
1975	36,710	5,575	31,135	23,451	7,684
1980	42,846	3,765	39,081	28,987	10,094
1985	49,435	2,767	46,668	34,879	11,789
1990	62,141	2,018	60,123	44,379	15,744

* Figures from the Bureau of Economic Analysis

TABLE 2-A

**Farm Versus Non-farm Employment *
as a Percentage of the Total Employment in Pitt County**

Year	% Farm Employment	% Non-farm Employment
1970	20.6	79.4
1975	15.2	84.8
1980	8.8	91.2
1985	5.6	94.4
1990	3.2	96.8

* Figures from Bureau of Economic Analysis

Land Use Trends

The generation of traffic on a particular thoroughfare is very closely related to the use of adjacent land areas. Some types of land uses generate much more traffic than others. For example, a commercial or retail area, such as a shopping center, will generate (or attract) much larger volumes of traffic than a residential area. The attraction between different land uses

varies with the intensity of development and the distance between those developed areas. Therefore, it becomes necessary to designate land uses by type for transportation planning. An analysis of the distribution of existing land uses serves as a basis for forecasting future land use needs and the resulting travel patterns.

The Town of Ayden is growing steadily, due in part to its status as a suburban community of the City of Greenville. This change has brought about an increased dependence upon the automobile for everyday living, as a growing percentage of the population consists of commuters. This commuting population has had a profound effect on various routes that were once thought of as low-volume rural roads, such as Wilbur Worthington Road (SR 1723).

Also occurring in recent years was the emergence of western Ayden as a commercial/retail center for the town. The visibility of this area from NC 11 has attracted many businesses over the past several years, including grocery stores, discount centers, and fast food restaurants. This development has caused a shifting in traffic patterns in the town, adding increased congestion to areas that were once considered sparsely residential or farming land.

Vehicle Registration Trends

Vehicle registration has increased at a much greater rate than population since the 1940's. This increase can be shown best by a graph depicting the change in the persons per vehicle ratio over time. This ratio is obtained by dividing the total population of the area by the total number of vehicles registered in that area. Figure 3 shows this comparison for North Carolina and Pitt County and includes projections to the year 2015. The results illustrate the transition from a non-automobile oriented society to one whose vitality is heavily dependent on the automobile.

Traffic Accidents

Traffic accident analysis is a serious and important consideration in the development of a thoroughfare plan, since accident records can assist in locating problem areas on the highway system. The source of traffic accidents can be broken down into three general categories. The first is the physical environment, including such things as road condition, weather, roadway obstructions, and traffic conditions. The second source is associated with the driver. These include the driver's mental alertness, distractions in the car, the ability to handle the vehicle, and reaction time. The third source is associated with the physical attributes of the vehicle itself. This would include such things as the condition of the brakes and tires,

PERSONS PER VEHICLE TRENDS FOR NORTH CAROLINA AND PITT COUNTY

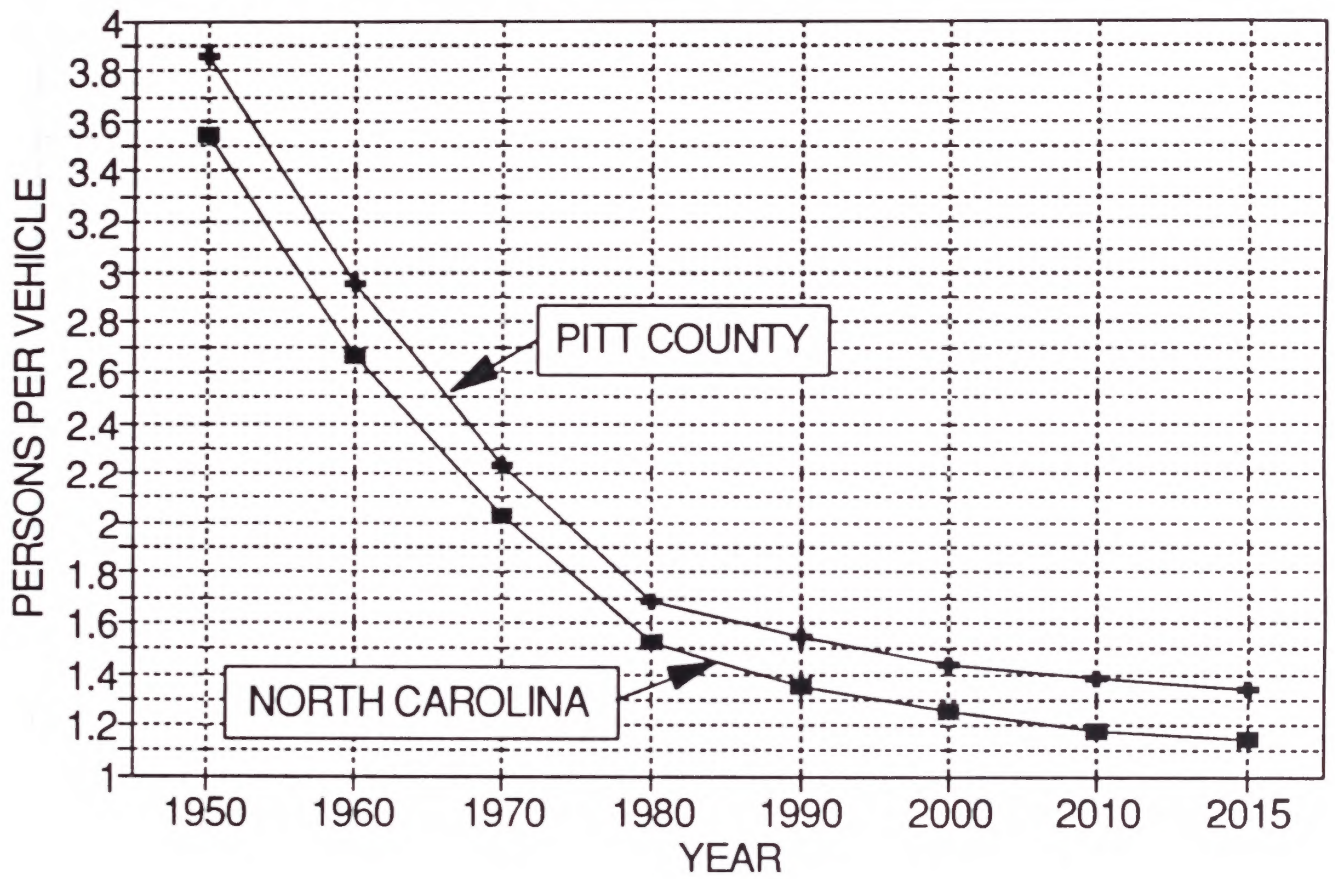


FIGURE 3

vehicle responsiveness, size of the vehicle, and how well the windshield wipers and defroster work. All traffic accidents can be attributed to one or more of these sources; however, the driver is often the primary source.

Accident data for a three year period, from January, 1989, through December, 1991, was studied while developing the Town's thoroughfare plan. NCDOT's Intersection Accident Listing lists eight intersections in the Ayden planning area that had 5 or more accidents within this period. These intersections are listed in Table 3.

TABLE 3				
Intersections with 5 or More Accidents				
Location	# of Accidents	# of Injuries	Severity Code	
			F	A B C
NC 11 @ NC 102	16	21	2	12 7
3rd Street @ Lee Street (SR 1149)	10	8	1	1 6
NC 11 @ Snowhill Street (SR 1113)	8	10	2	2 3 3
NC 102 @ Wilbur Worthington Road (SR 1723)	6	20	1	8 5 6
Lee Street (SR 1149) @ Venters Street	6	1	1	
Lee Street (SR 1149) @ First Street	5	14	1	5 3 5
Lee Street (SR 1149) @ Hines Drive (SR 1122)	5	2	1	1
Second Street @ East Avenue	5	3		3

Key to Severity Codes:
 F - Fatality
 A - Class "A" Injury - Incapacitating. The injury is obvious and severe enough to prevent carrying on normal activities for at least 24 hours; e.g., massive loss of blood or broken bone.
 B - Class "B" Injury - Non-incapacitating. In this case, an injury other than a fatality or Class "A" injury is evident.
 C - Class "C" Injury - No visible sign of injury, but complaint of pain or momentary loss of consciousness occurs.

Travel Demand

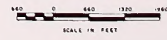
Travel demand is generally reported in the form of average daily traffic counts. Traffic counts are taken regularly at several locations in and around the Ayden planning area by the North Carolina Department of Transportation. From these trends and with the previously discussed factors in mind, future travel demand in the Ayden area was estimated. Average daily traffic figures for 1990 and projections for the year 2015 for various locations are shown in Figure 4. The analysis of these projections will be discussed in the next chapter.



FIGURE 4
 RECOMMENDED
 THOROUGHFARE PLAN
AYDEN

PITT COUNTY
 NORTH CAROLINA
 PREPARED BY THE
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH

IN COOPERATION WITH
 U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION



LEGEND

1990 AVERAGE DAILY TRAFFIC
 2015 ADT WITHOUT PLAN
 2015 ADT WITH PLAN

	EXISTING	PROPOSED
MAJOR THOROUGHFARE	—————	—————
MINOR THOROUGHFARE	—————	—————
INTERCHANGES	●	●

4. DEVELOPMENT OF THE THOROUGHFARE PLAN

During the development of a thoroughfare plan, there are many concerns and issues which must be evaluated before a final plan can be recommended and adopted. This chapter will identify both the transportation and the environmental concerns that were studied.

Capacity Analysis

A good indication of the adequacy of the existing major street system is a comparison of the traffic volumes with the ability of the streets to move traffic freely and at a desirable speed. Capacity is defined as the maximum number of vehicles that are expected to pass over a given section of roadway during a given time period under prevailing roadway and traffic conditions. The relationship of traffic volumes to the capacity of the roadway will determine the **level-of-service** being provided. A level-of-service is a qualitative measure describing the operating conditions within a traffic stream and their perception by motorists and/or passengers. Six levels of service are used to identify the conditions existing along a highway or street. These levels of service are illustrated in Figure 5.

A level-of-service (LOS) definition generally describes the roadway operating conditions in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations, from A to F, with level-of-service A representing the best operating conditions and level-of-service F, the worst. The various levels of service are defined below for uninterrupted flow facilities, but the basic concepts apply to all roads.

Level-of-Service A represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to maneuver within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist, passenger, or pedestrian is excellent.

Level-of-Service B is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from LOS A. The level of comfort and convenience provided is somewhat less than at LOS A, because the presence of others in the traffic stream begins to affect individual behavior.

Level-of-Service C is in the range of stable flow, but marks the beginning of the range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now

affected by the presence of others, and maneuvering within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this point.

Level-of-Service D represents high-density, but stable, flow. Speed and freedom to maneuver are severely restricted, and the driver or pedestrian experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.

Level-of-Service E represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform, value. Freedom to maneuver within the traffic stream is extremely difficult, and it is generally accomplished by forcing a vehicle or pedestrian to "give way" to accommodate such maneuvers. Comfort and convenience levels are extremely poor, and driver or pedestrian frustration is generally high. Operations at this level are usually unstable because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.

Level-of-Service F is used to define forced or breakdown flow. This condition exists wherever the amount of traffic approaching a point exceeds the amount which can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go waves that are extremely unstable. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. Level-of-service F is used to describe the operating conditions within the queue, as well as the point of breakdown. It should be noted, however, that in many cases operating conditions of vehicles or pedestrians discharged from the queue may be quite good. Nevertheless, it is the point at which arrival flow exceeds discharge flow that causes the queue to form, and level-of-service F is an appropriate designation for such points.

The recommended improvements and overall design of the Thoroughfare Plan were based on achieving a minimum LOS D on existing facilities and LOS C on new facilities. LOS D is considered the **practical capacity** of a facility, or that point at which the public begins to express dissatisfaction.

There are several locations in the Ayden area that will experience capacity problems within the 25-year design period. These include sections of NC 102/Third Street and Lee Street (SR 1149). If the street system in this area remains as it is today, then these roads will be over-capacity, or experiencing level-of-service F, by the year 2015. This breakdown in the system would result in stop-and-go traffic as well as increases in accident frequency, air pollution, travel times, automobile operating costs, and frustration levels.



LEVEL OF SERVICE - A



LEVEL OF SERVICE - B



LEVEL OF SERVICE - C



LEVEL OF SERVICE - D



LEVEL OF SERVICE - E



LEVEL OF SERVICE - F

LEVELS OF SERVICE

FIGURE 5

Another problem with the current road system is the inability of residents in northern Ayden to easily access NC 11. Currently, there are two choices for people in these areas: either travel north on Lee Street (SR 1149) to Reedy Branch Road (SR 1131) to access NC 11 North; or travel south through town to a radial facility in southern Ayden, such as Snowhill Street or Lee Street, and access NC 11 South. Neither of these routes is direct and both add to congestion on other roads in town not meant to serve these purposes. For this reason, two additional radial facilities, both in the northern section of Ayden, were proposed to provide easier access to a major facility. The extension of Snowhill Street and its connection to NC 11 in northwest Ayden will provide residents of these neighborhoods with a quicker, more direct route north to Greenville. The extension of College Street, along with the construction of the Northern Loop, will do much the same for the residents of northeastern Ayden. It is hoped that these new facilities will alleviate some of the congestion on the existing major downtown thoroughfares, especially at the intersection of NC 11 and NC 102, and provide better access for the residents of northern Ayden.

The final major system deficiency noted was the lack of an inner loop facility in southern Ayden connecting the major radial streets: Snowhill, Lee, and Weyerhauser. The construction of the Juanita Street extension, connecting these roads, will allow for easier cross-town movements and discourage residential cut-through traffic in the southern Ayden neighborhoods.

Environmental Considerations

The legislation that dictates the necessary procedures regarding environmental impacts is the National Environmental Policy Act. Section 102 of this act requires the execution of an environmental impact statement, or EIS, for road projects that have a significant impact on the environment. The EIS would then be reviewed by various federal and state agencies. Included in an EIS would be the project's impact on wetlands, water quality, historic properties, wildlife, and public lands. While this report does not cover the environmental concerns in as much detail as an EIS would, preliminary research was done on several of these factors and is included below.

Wetlands¹

In general terms, wetlands are lands where saturation with water is the dominant factor in determining the nature of soil development and the types of plant and animal communities living in the soil and in its surface. The single feature that most wetlands share is soil or substrate that is at least periodically saturated with or covered by water. The water creates severe physiological problems for all plants and animals except those that are adapted for life in water or in saturated soil.

Wetlands are crucial ecosystems in our environment. They help regulate and maintain the hydrology of our rivers, lakes, and streams by slowly storing and releasing flood waters. They help maintain the quality of our water by storing nutrients, reducing sediment loads, and reducing erosion. They are also critical to fish and wildlife populations. Wetlands provide an important habitat for about one third of the plant and animal species that are Federally listed as threatened or endangered.

In this study, the impacts to wetlands were determined using the National Wetlands Inventory Mapping, available from the U.S. Fish and Wildlife Service. The location of wetlands in the Winterville and Ayden planning areas is shown in Figure 6.

Wetland impacts have been avoided or minimized to the greatest extent possible while preserving the integrity of the transportation plan. As shown Figure 6, there are no major wetland crossings within the Ayden planning area. The project with the greatest potential wetland impacts is the Northern Loop, which may impact wetlands along Swift Creek.

Threatened and Endangered Species

A preliminary review of the Federally Listed Threatened and Endangered Species within the Ayden planning area was done to determine the effects new corridors could have on the wildlife. Currently, no threatened or endangered species have been located within the planning area. However, an animal species listed as a special concern in North Carolina has been found in a local creek and could occur in other area streams. This species is a type of crayfish known as *procambarus medialis*. In addition, a plant species known as *amphicarpum purshii*, or pinebarrens goober grass, has been identified in a location southeast of Ayden. This plant species is typically found in pine savannahs and pocosins. It is listed as very rare globally and rare or uncommon in North Carolina.

Closer to the intersection of NC 43 and NC 102 on the eastern side of Ayden, a red-cockaded woodpecker site has been documented. This species is federally listed as endangered, which means that it is threatened with extinction throughout all or a significant portion of its range. It is imperiled both globally as well as in North Carolina because of its rarity. Future sightings of this species in the planning area could have a significant impact on roadway construction.

The Threatened and Endangered Species Act of 1973 allows the U.S. Fish and Wildlife Service to impose measures on the Department of Transportation to mitigate the environmental impact of a road project on endangered plants and animals and critical wildlife habitats. By locating rare species in the planning stage of road construction, we are able to avoid or minimize these impacts.

Historic Sites

The location of historic sites in the Ayden planning area was investigated to determine the impacts of the various alternatives studied. The federal government has issued guidelines requiring all State Transportation Departments to make special efforts to preserve historic sites. In addition, the State of North Carolina has issued its own guidelines for the preservation of historic sites. These two pieces of legislation are described below:

National Historic Preservation Act - Section 106 of this act requires the Department of Transportation to identify historic properties listed in the National Register of Historic Places and properties eligible to be listed. The DOT must consider the impact of its road projects on these properties and consult with the Federal Advisory Council on Historic Preservation.

NC General Statute 121-12(a) - requires that the DOT identify historic properties listed on the National Register, but not necessarily those eligible to be listed. DOT must consider impacts and consult with the North Carolina Historical Commission, but it is not bound by their recommendations.

There are no properties in the Ayden planning area listed on the National Register of Historic Places. However, there are four houses on the Study List that may be registered sometime in the future. These are as follows:

- * Abram Cox House - located on the east side of Wilbur Worthington Road (SR 1723), 0.5 miles south of NC 11;
- * Woody McLawhorn Store and Doctor's Office - located on the west side of Wilbur Worthington Road (SR 1723), 0.2 miles south of Hines Drive (SR 1122);
- * Mumford-Jolly House - located on the east side of Jolly Road (SR 1120), 0.5 miles south of NC 11;
- * Jesse Nelson House - located on the northeast side of Wilbur Worthington Road (SR 1723), 0.4 miles south of Country Club Drive (SR 1943).

Only one project has the potential to be disruptive to any of these historic sites. The extension of Snowhill Street and its intersection with Jolly Road (SR 1120) in northwest Ayden will be in close proximity to the Mumford-Jolly House listed above. Care should be taken to make certain that this and all historic sites and natural settings are preserved. Therefore, a closer study should be done in regard to the local historic sites just prior to the construction of any proposal.

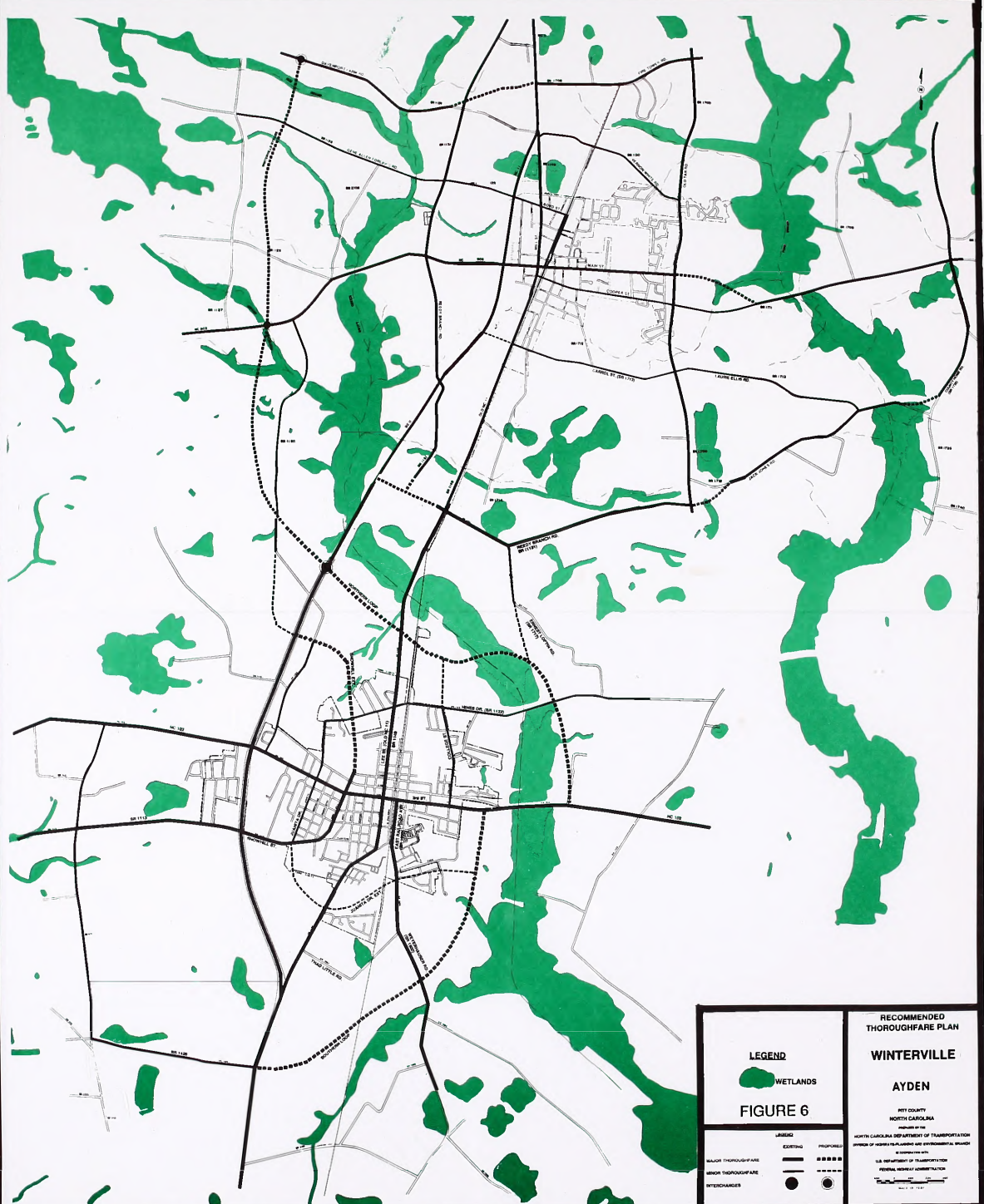
Air and Noise Pollution

The design of a thoroughfare system can have a significant effect on the amount of pollutants added to the atmosphere. Pollutant emissions are reduced when traffic is permitted to flow smoothly and by the reduction of congestion and stop-and-go conditions. This reduction of pollutants is created by the more efficient use of fuel offered by free-flow conditions.

The control of noise pollution in the vicinity of residential neighborhoods is another important aspect of transportation planning. By designating certain routes as thoroughfares, we are able to direct the heaviest flows of traffic through areas that are amenable to or even desire such traffic. This reduces the noise from automobile and truck traffic in areas where quieter surroundings are desired.

Air and noise pollution levels will increase the most along the major routes, including NC 11, NC 102/Third Street, and Lee Street (SR 1149), due to the continually increasing traffic volumes using these facilities. However, this will be offset by the reduction in noise and air pollutants on streets and in residential neighborhoods from which the bypass traffic on the Northern and Southern Loops is transferred. If the thoroughfare plan is implemented, the overall air and noise quality for the Ayden area should be better due to the improved traffic operating conditions along both the new and existing routes.

¹ Dahl, T.E. and C.E. Johnson, Status and Trends of Wetlands in the Conterminous United States, Mid-1970's to Mid-1980's. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C., 1991.



LEGEND

 WETLANDS

FIGURE 6

	EXISTING		PROPOSED
	MAJOR THOROUGHFARE		MINOR THOROUGHFARE
	INTERCHANGES		

RECOMMENDED THOROUGHFARE PLAN

WINTERVILLE

AYDEN

WIT COUNTY

NORTH CAROLINA

PREPARED BY:
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAY PLANNING AND ENVIRONMENTAL BRANCH
 1000 SOUTH TRYON STREET
 RALEIGH, NORTH CAROLINA 27601
 DATE: 1988

5. MUNICIPAL AND PUBLIC INVOLVEMENT

Previous to this thoroughfare planning study, the Town of Ayden had a mutually adopted thoroughfare plan dating from 1978. In July of 1980, a revision to the thoroughfare plan was requested by the Town due to a proposed Community Development Project. Over the following two months, various alternatives were presented and discussed. An amended plan was then mutually adopted in late-1980 to account for this concern. In September of 1989, the Town requested that the thoroughfare plan be reviewed and updated. Since they were updating their land use plan with help from the Department of Natural Resources and Community Development, it seemed logical to also update their transportation plan. Over the past decade, several of the previously planned projects had become obsolete or unbuildable due to changes in the growth patterns in the area. Also, since Ayden continues to grow at a steady pace, new facilities would be needed to divert traffic from both residential and downtown areas.

The project was assigned and work was started in April, 1990, by the Statewide Planning Branch of the North Carolina Department of Transportation. Because of Ayden's proximity to the Towns of Winterville and Grifton, it was decided that the three plans should be studied concurrently to provide for the most cohesive and integrated road network possible. In addition, several different groups were actively involved in the planning process, including, but not limited to: the Town Planning Board, the Town Board of Commissioners, the North Carolina Department of Economic and Community Development, the North Carolina Department of Transportation, and the general public.

On January 23, 1991, a joint planning board meeting was held with representatives from the Towns of Ayden, Winterville, and Grifton, Pitt County, the NC Department of Economic and Community Development, and the NC Department of Transportation to discuss thoroughfare planning and specific problems or concerns that were perceived as crucial to their transportation plan. Copies of the previous thoroughfare plans were presented and discussed, along with current traffic counts and accident statistics in the region. Interest was also high regarding Greenville's Thoroughfare Plan, which had recently been adopted. Most of the transportation improvements suggested for Ayden at this meeting dealt with a proposed loop facility that would divert the traffic on NC 102 wanting to go north to Greenville or south to Dupont or Kinston from their downtown area. A northern connection into a proposed Winterville Bypass was also suggested for continuity between the two towns' road systems.

On June 17, 1991, a planning board meeting was held with the Town of Ayden, the NC Department of Economic and Community Development, and NCDOT. At this meeting, problems specific to Ayden were identified and discussed. Among the suggestions at this meeting were: an extension of Snowhill Street, which would

provide an additional radial facility connecting the downtown area with NC 11; an extension of Juanita Street, connecting the major radial facilities in the southern part of Ayden and providing some relief to the downtown facilities from cross-town traffic; and continued support for the northern and southern loops. In addition to these major roadway construction projects, several specific sites were identified as problem areas, including the intersections of: NC 11 and NC 102, due to the proximity of two traffic signals, an elementary school driveway, and a shopping center entrance; NC 11 and Snowhill Street (SR 1113); NC 102 and Wilbur Worthington Road (SR 1723); and Old Snowhill Road (SR 1113) and Pleasant Plain Road (SR 1111).

On January 6, 1992, preliminary recommendations were presented to the Ayden Planning Board for discussion. The widening of 3rd Street and its impact on the large, older trees between Laurinburg and Washington Streets was discussed at length. One proposed solution was the designation of both 2nd and 3rd Streets as one-way thoroughfares, one traveling in each direction. This solution, however, was not considered appropriate since 2nd Street is primarily a narrow, residential road and the introduction of higher volumes of through-traffic was not desired. Also discussed was the proposal to relocate parking from the two major thoroughfares in the downtown area, Lee Street (SR 1149) and NC 102/3rd Street, to off-street parking lots when widening became necessary. Active planning by the Town in this area should lessen the impact of this proposal by designating future parking areas in advance of the roadway construction.

On April 13, 1992, the thoroughfare plan recommendations were presented to the Ayden Board of Commissioners for discussion and comments. The proposed widening of 3rd Street was again discussed and the widening of the controversial section between Laurinburg and Washington Streets was removed from the recommendations.

On May 11, 1992, a public hearing was held at the Ayden Town Hall to receive comments on the plan from the general public. This meeting was advertised in the newspaper prior to its occurrence. After the major projects were presented, the floor was opened for discussion. There were no negative comments on the plan from the audience. The Board of Commissioners adopted the plan unanimously.

6. RECOMMENDATIONS

The following is a list of roads that are recommended to serve as major and minor thoroughfares for Ayden as discussed in Chapter II. A description of each proposed improvement is included, followed by a brief discussion of the road's function and deficiencies. More detail on the physical and operational characteristics of each facility is given in the Street Inventory and Recommendations section, Appendix B. The mutually adopted thoroughfare plan is shown in Figure 7.

MAJOR THOROUGHFARES:

Northern Loop - Construct a two-lane roadway on new location, connecting with the Winterville Bypass. This road will start at the intersection of the Winterville Bypass and NC 11 and continue around northern Ayden, intersecting with Lee Street (SR 1149), College Street Extension, Ernest Loftin Road Extension (SR 1717), Hines Drive (SR 1122), and NC 102 on the eastern side of Ayden.

This facility will redirect the through-traffic on NC 102 that is going north to Greenville, moving it out of the downtown area. It will also act as a loop facility for the residents of Ayden, providing a quick, non-residential path for those in northern and eastern Ayden to access NC 11.

Southern Loop - Construct a two-lane roadway on new location, beginning at the intersection of NC 11 and SR 1109, crossing Weyerhauser Road (SR 1900) south of Thad Little Road (SR 1901), connecting with the proposed Juanita Drive Extension, and ending at NC 102 just west of the Swift Creek Bridge.

The Southern Loop will serve two functions, much like the Northern Loop. It will allow through-traffic wishing to access NC 11 from NC 102 to bypass the downtown Ayden area, and it will also serve as a loop facility for southern Ayden as the town develops in this area.

Snowhill Street Extension - Construct a two-lane roadway on new location, connecting the existing Snowhill Street with NC 11 south of its intersection with SR 1120. This road will cross SR 1122 between Sunset Drive and Robin Drive. In addition, the section of Jolly Road (SR 1120) west of NC 11 should be extended south to intersect NC 11 at Snowhill Street Extension and to avoid the interchange of NC 11 and the Winterville Bypass.

The Snowhill Street Extension will act as a radial street for the northwest section of Ayden, providing improved access for this part of town to areas north of Ayden. It will also provide an additional connection for downtown Ayden to NC 11, thus decreasing some of the congestion at the existing NC 11/NC 102 intersection.

NC 102/3rd Street - Widen, re-stripe, and/or take parking off of 3rd Street in various places for a 5-lane cross section through Ayden. This will be needed in the next 10-20 years.

Current traffic volume trends on this road indicate that it will exceed the practical capacity of a two-lane roadway within the 25 year design period. However, the construction of the Northern and Southern Loops will help to alleviate this problem and may preclude the need for disruptive widening in the downtown area. This roadway should be monitored periodically during the planning period to determine the amount of congestion occurring in the downtown area and if the roadway should be widened. If congestion on this road becomes severe, people will start to avoid the downtown area to the detriment of the businesses located there.

The most efficient and cost-effective way of increasing the capacity of the road would be to remove on-street parking. While this idea may not be popular, if it is planned for effectively, then it will not cause a great deal of disturbance to the businesses. Plans should be made to reserve lots in the downtown area over the next several years, as they become available, to be used as future parking lots.

The highest traffic volumes on 3rd Street occur on the western side of Ayden, between Lee Street (SR 1149) and NC 11, with a range of 6,700 to 9,300 vehicles per day travelling on this road. The section of 3rd Street on the eastern side of Mill Street is less critical, but will also exceed capacity within the design period.

Although a widening approach is recommended along the entire stretch of 3rd Street from Lee Street to the existing multi-lane section near Verna Street, it is improbable that the section between Laurinburg Street and Washington Street will be widened to five lanes due to the canopy of large, old trees in this area. Since this is a quiet residential neighborhood and high volumes of traffic will not have origins or destinations here, a center turn lane would not be necessary. In addition, when Snowhill Street has been extended, alternate routes to NC 11 will be available for those who wish to go north or south and avoid the strip development and traffic signals along western 3rd Street. For these reasons, a two-lane roadway should be sufficient to handle the projected traffic volumes during the design period on this section of 3rd Street.

NC 11 - No improvements are necessary on this roadway in the design period.

Lee Street (SR 1149) - Widen, re-stripe, and/or take parking off sections to allow for greater capacity through town. Five lanes are preferred through downtown. Depending on future development, two or possibly three lanes may be all that are needed on this road outside of town. (See discussion of on-street parking in NC 102/3rd Street proposal.)

Projected traffic volumes on this roadway indicate that Lee Street will come very near to its practical capacity as a two lane road within the design period. This will decrease the safety and the speeds on this road unless additional lanes are provided.

Weyerhauser Road/East Avenue (SR 1900) - Minor widening will be needed on this road. See "Other Projects."

MINOR THOROUGHFARES:

Juanita Street Extension - Construct a two-lane roadway on new location, starting at the intersection of Juanita and Snowhill Streets, continuing southeast to intersect with Lee Street just north of Allen Drive, crossing Gum Swamp Road (SR 1900) at Franklin Drive, and continuing east to connect with the proposed Southern Loop.

This road will provide a much needed east-west connection of Ayden's main radial streets - Snowhill Street, Lee Street, and Gum Swamp Road. This road will lessen the traffic demand on 3rd Street (NC 102) and take traffic off of certain residential streets in southern Ayden by offering an alternate route through the area.

College Street Extension - Extend College Street from its intersection with Hines Drive (SR 1122) to the proposed Ayden Northern Loop.

This extension will provide an additional access to the Northern Loop and quicker access to NC 11 for residents in eastern Ayden.

Ernest Loftin Road (SR 1717) - Pave roadway to secondary road standards and construct a connector to intersect with the proposed Ayden Northern Loop.

This extension will provide Ayden with a more direct route to eastern Winterville and Greenville when the Ayden Northern Loop has been constructed.

Jolly Road (SR 1120) - Extend the section of Jolly Road on the west side of NC 11 and relocate the intersection of Jolly Road with NC 11 south of its present location. Also, minor widening is needed along the existing road. (See "Other Projects.")

Due to the construction of the Winterville Bypass and its interchange with NC 11 just south of Swift Creek, the alignment of Jolly Road will need to be shifted to the south. The new intersection of Jolly Road and NC 11 will coincide with the proposed extension of Snowhill Street.

Hines Drive (SR 1122) - Minor widening will be needed on this road. See "Other Projects."

Loop Road (SR 1109) - No improvements will be necessary on this road in the design period.

Pleasant Plain Road (SR 1111) - No improvements will be necessary on this road in the design period.

OTHER PROJECTS:

Intersections of NC 11 and SR 1120 with NC 102 - Due to the close proximity of a shopping center, a school, and two closely spaced traffic signals, this area becomes congested during the peak travel hours. A traffic study should be done to determine whether the relocation of certain driveways or the re-timing of the traffic signals could improve this situation.

NC 11 at Snowhill Street - A traffic study needs to be done at this intersection in response to the two fatalities here in the past three years.

Minor widening - Widen sections of the following two lane roads to 24 feet to meet secondary road standards and for capacity, safety, and driver comfort reasons:

- NC 102 outside the Town Limits
- SR 1120, Jolly Road
- SR 1122, Hines Drive
- SR 1723, Wilbur Worthington Road
- SR 1900, Weyerhauser Road

Traffic islands - Traffic islands with stop signs are needed at several rural intersections to prevent missed stops and fatal high speed accidents. The worst intersection is listed below:

NC 102 and Wilbur Worthington Road (SR 1723) - Five accidents have occurred here in the past three years, including one fatality and 19 other injuries.

Road paving projects - A portion of the Highway Trust Fund goes toward the paving of secondary roads throughout the state. Originally, all unpaved roads carrying more than 50 vehicles per day were to have been paved by the year 2000, with the balance of roads being paved by 2006. While this time frame has been altered slightly due to a revenue shortfall, the basic goals of the program are still in place.



FIGURE 7

ADOPTED BY:
TOWN OF AYDEN, MAY 11, 1992

RECOMMENDED FOR APPROVAL BY: *m. e. wall*
STATEWIDE PLANNING BRANCH, MAY 19, 1992

ADOPTED BY:
DEPT. OF TRANSPORTATION, JULY 10, 1992

PUBLIC HEARING: MAY 11, 1992

LEGEND

	EXISTING	PROPOSED
MAJOR THOROUGHFARE	—————	▣▣▣▣
MINOR THOROUGHFARE	—————	●
INTERCHANGES	●	○

THOROUGHFARE PLAN
AYDEN

PITT COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH
IN COOPERATION WITH
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE 1" = 1/2 MILE

MAY 11, 1992

7. CONSTRUCTION PRIORITIES, USER BENEFITS, AND COST ESTIMATES

The improvements suggested in a thoroughfare plan obviously cannot be undertaken all at once, nor should they be. The cost would be overwhelming and the need for some of the projects is not immediate. In an effort to reflect the relative value of various improvements, an assessment has been made of the benefits that can be expected from each project. These benefits can then be compared to the costs involved and a priority listing developed.

Three principal measures were used to estimate the benefits that would be derived from each project: road user cost savings, the potential for increased economic development resulting from the improvement, and the environmental impacts, both positive and negative, which may result. The first measure is an estimate of actual dollar savings, while the others are estimates of the probability of the resulting change. These measures are described below.

Reduced road user costs should result from any roadway improvement, from a simple widening to the construction of a new roadway to relieve congested or unsafe conditions. Comparisons of the existing and the proposed facility have been made in terms of vehicle operating costs, travel time costs, and accident costs. These user benefits are computed as total dollar savings over a typical 20-year project life expectancy using data such as project length, base year and design year traffic volumes, traffic speed, type of facility, and volume/capacity ratio.

The impact of a project on economic development potential is denoted as the probability that it will stimulate the economic development of an area by providing access to land with development potential and reducing transportation costs. It is a subjective estimate based on the knowledge of the proposed project, local development characteristics, and land development potential. The probability is rated on a scale from 0 (none) to 1.00 (excellent), along with the following intermediate levels:

TABLE 4	
Probability Estimation Guide	
Subjective Evaluation	Success or Impact Probability
-----	-----
Excellent, highest	1.00
Very good, very substantial	.75
Good, substantial, considerable	.50
Fair, some	.25
Poor, none	.00

The environmental impact analysis considers the effect of a project on the physical, social/cultural, and economic environment. Table 5 lists the items that are considered when evaluating the impact on the environment. Many of these have been accounted for in evaluating the project with respect to user benefits, cost, and economic development potential. However, twelve environmental factors are generally not considered in these evaluations. They are the environmental impacts of a project on: (1) air quality, (2) water resources, (3) soils and geology, (4) wildlife, (5) vegetation, (6) neighborhoods, (7) noise, (8) educational facilities, (9) churches, (10) parks and recreational facilities, (11) historic sites and landmarks, and (12) public health and safety. The summation of both positive and negative impact probabilities with respect to these factors provides a measure of the relative environmental impact of a project.

TABLE 5
Environmental Considerations
Physical Environment ----- Air quality Water Resources Soils and Geology Wildlife Vegetation
Social and Cultural Environment ----- Housing Neighborhoods Noise Educational Facilities Churches Parks and Recreational Facilities Public Health and Safety National Defense Aesthetics
Economic Environment ----- Businesses Employment Economic Development Public Utilities Transportation Costs Capital Costs Operation and Maintenance Costs

Offsetting the benefits that would be derived from any project is the cost of its construction. A new facility, despite its high projected benefits, might prove to be unjustified due to the excessive costs involved in construction. The highway costs estimated in this report are based on the average statewide construction costs for similar project types. A rough estimate of anticipated right-of-way costs is also included. Table 6 evaluates the major proposed projects in the Ayden planning area with respect to user benefits, estimated costs, probability of economic development, and environmental impact.

Many considerations go into the evolution of a project from initial idea to construction. Political, social, environmental, and economic considerations have varying amounts of influence at different points in time. For this reason, the adoption of a thoroughfare plan does not explicitly include priorities. However, priorities based on the factors already mentioned have been provided to help both the state and the municipality in their efforts to implement the improvements recommended in this report. Table 6 also ranks the major projects in three priority groups.

Priority group 1 consists of those projects aimed at alleviating existing traffic congestion problems, both through the widening of an existing road and the construction of a new road. Sections of NC 102/3rd Street in western Ayden are currently reaching their practical capacity and need to be widened. This will allow for more smoothly flowing traffic and will also help reduce the possibility of accidents due to the combination of congestion and driver frustration. In addition to this widening, the extension of Snowhill Street will help to alleviate congestion in this area by providing an alternate route for residents wishing to access NC 11 North. Implementation of these proposals should be undertaken sometime in the next 5 years due to the quickly growing commercial development in this area.

Priority group 2 includes projects that should improve the flow of traffic through and around Ayden and provide quick and convenient access to various parts of the town. The widening of Lee Street (SR 1149) will add capacity to one of the primary north-south routes in the town. The Ayden Northern Loop, along with the associated extensions of College Street and Ernest Loftin Road (SR 1717), will serve two major functions. First, it will provide the residents of the northern neighborhoods with more direct access to NC 11; and second, it will allow bypass traffic between NC 102 and NC 11 North to avoid the downtown area. The Southern Loop will provide similar service for the southern part of town as development spreads into this area over the coming years.

Priority group 3 consists of all other projects in the thoroughfare plan that have not yet been mentioned. The largest of these is the Juanita Drive Extension. This road, while not yet justified from a cost standpoint, will provide a crucial

inner loop system in southern Ayden. This roadway will provide quicker access between the radial streets in southern Ayden and, more importantly, will discourage residential cut-through traffic in these neighborhoods by providing an alternate route.

These projects and their priorities are shown in Figure 8.

TABLE 6 - BENEFITS ANALYSIS AND CONSTRUCTION PRIORITIES

AYDEN	LENGTH (mi.)	EXIST. X-SECTION	PROP. X-SECT.	PROP. ACCESS CONTROL	COSTS (x \$1,000)		BENEFITS (x \$1,000)	PROBABLE IMPACTS	
					CONST.	ROW TOTAL		Econ. Develop	Environmental
PRIORITY GROUP 1:									
NC 102 / 3rd Street	1.04	27'-50' 2L/2LP/3L	D (5L)] none]	1,496	50 1,546	4,552	0.60	0.30 0.20
	0.50	30'-45' 2L/2LP	I (3L)						
Snowhill Street Ext.	1.41	N/A	L (2L)	none	1,410	171 1,581	3,375	0.30	0.30 0.40
PRIORITY GROUP 2:									
Lee Street (SR 1149)	1.95	20'-50' 2L/2LP/3LP	D (5L)	none	1,815	92 1,907	2,861	0.40	0.20 0.20
Ayden Northern Loop	2.84	N/A	L (2L)	none	5,000	344 5,344	20,582	0.30	0.30 0.50
Ayden Southern Loop	2.78	N/A	L (2L)	none	3,061	337 3,398	7,589	0.30	0.20 0.40
PRIORITY GROUP 3:									
Juanita Street Ext.	1.76	N/A	L (2L)	none	1,760	213 1,973	247	0.20	0.30 0.30

Key to abbreviations:

Exist. X-Sect. - Existing roadway cross-section

2L, 3L - 2 or 3 lane roadway

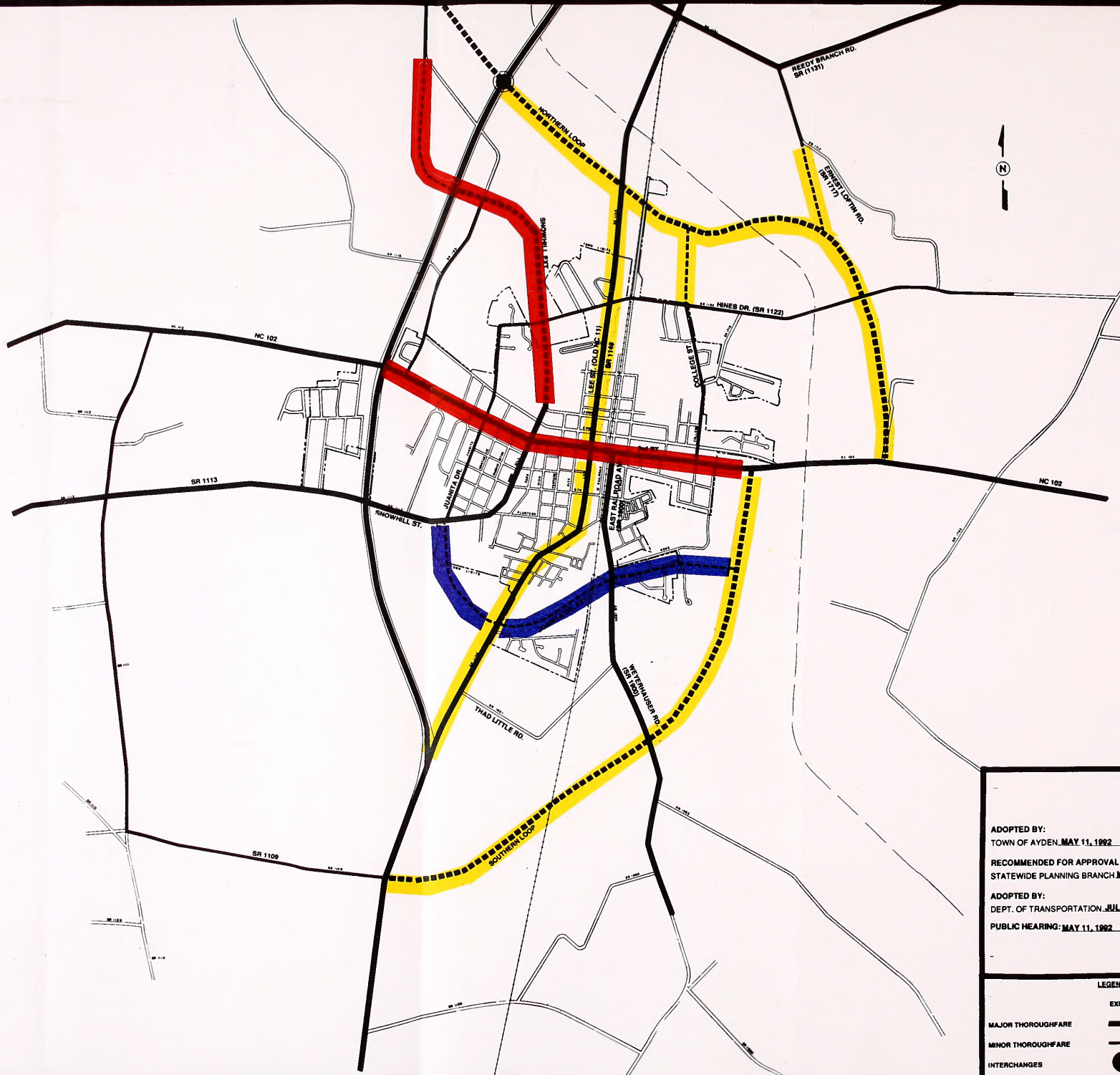
2LP, 3LP - 2 or 3 lane road with parking on one or both sides

N/A - Not applicable

Prop. X-Sect. - Proposed roadway cross-section

D, I, L - See Appendix A, Figure A-1, for illustrations of these typical thoroughfare cross-sections

2L, 3L, 5L - 2, 3, or 5 lane roadway



- PRIORITY 1
- PRIORITY 2
- PRIORITY 3

CONSTRUCTION PRIORITIES

FIGURE 8

ADOPTED BY:
TOWN OF AYDEN, MAY 11, 1992

RECOMMENDED FOR APPROVAL BY: *m.r. 2/26*
STATEWIDE PLANNING BRANCH, MAY 18, 1992

ADOPTED BY:
DEPT. OF TRANSPORTATION, JULY 10, 1992

PUBLIC HEARING: MAY 11, 1992

	EXISTING	PROPOSED
MAJOR THOROUGHFARE		
MINOR THOROUGHFARE		
INTERCHANGES		

THOROUGHFARE PLAN
AYDEN
PITT COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-PLANNING AND ENVIRONMENTAL BRANCH
IN COOPERATION WITH
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE: 1" = 100'

MAY 11, 1992

8. IMPLEMENTATION

Implementation is one of the most important aspects of the transportation plan. Unless implementation is an integral part of this process, the effort and expense associated with developing a plan is lost. To neglect the implementation process is a three-fold loss: the loss of the capital expenditures used in developing a plan; the opportunity cost of the capital expenditures; and, most importantly, the loss of the benefits which would accrue from an improved transportation system.

There are several administrative controls and implementation tools which can aid in the implementation of a thoroughfare plan. They are generally mandated through Federal and State Legislation. They include: Mutual Adoption of the Thoroughfare Plan, Subdivision Regulations, Zoning Ordinances, Official Maps, Urban Renewal, Capital Improvements Programs, and Development Reviews. Generally, two issues play a major role in the implementation process -- available finances and citizen involvement. Effective use of the controls and tools listed above are indicative of good planning and minimize the effects of limited finances and negative citizen reaction to specific elements of a plan. It is through good planning that maximum use is made of every available dollar and that citizen involvement and approval of the transportation plan is obtained.

State and Municipal Adoption of the Thoroughfare Plan

Chapter 136, Article 3A, Section 136-66.2 of the General Statutes of North Carolina provides that after development of a thoroughfare plan, the plan may be adopted by the governing body of the municipality and the Department of Transportation to serve as the basis for future street and highway improvements. The General Statutes also require that, as part of the plan, the governing body of the municipality and Department of Transportation shall reach agreement on responsibilities for existing and proposed streets and highways included in the plan. Facilities which are designated a State responsibility will be constructed and maintained by the Division of Highways. Facilities which are designated a municipal responsibility will be constructed and maintained by the municipality.

After mutual plan adoption, the Department of Transportation will initiate negotiations to determine which of the existing and proposed thoroughfares will be a Department responsibility and which will be a municipal responsibility. Chapter 136, Article 3A, Section 136-66.1 of the General Statutes provides guidance in the delineation of responsibilities. In summary, these statutes state that the Department of Transportation shall be responsible for those facilities which serve heavier volumes of through-traffic and traffic from outside the area to the major business, industrial, governmental, and institutional destinations located inside the municipality. The municipality is responsible for those facilities which serve primarily internal travel.

Subdivision Regulations

Subdivision regulations are locally adopted laws governing the process of converting raw land into building sites. From the planner's view, subdivision regulations are important at two distinct levels. First, they enable the planner to coordinate the otherwise unrelated plans of a great many individual developers. This process assures that provisions are made for land development elements such as roadway right-of-way, parks, school sites, water lines and sewer outfalls, and so forth. Second, they enable the planner to control the internal design of each new subdivision so that its pattern of streets, lots, and other facilities will be safe, pleasant, and economical to maintain.

To be most effective, subdivision regulations and their administration must be closely coordinated with other local governmental policies and ordinances. Among the more important of these are the Comprehensive Growth Plan, the Utilities Extension Master Plan, and the Thoroughfare Plan.

In practice, subdivision regulations can provide some very positive benefits such as requiring portions of major streets to be constructed in accordance with the Thoroughfare Plan or requiring subdividers to provide for the dedication and/or reservation of rights-of-way in advance of construction. These practices reduce the overall cost of the plan by having some costs borne by developers. Projects in Ayden that could be implemented or protected by subdivision ordinances include:

- construction of the Northern Loop
- construction of the Southern Loop
- extension of Snowhill Street from First Street to NC 11
- extension of Juanita Street from Snowhill Street to the proposed Southern Loop
- extension of College Street from Hines Drive (SR 1122) to the proposed Northern Loop
- extension of Ernest Loftin Road (SR 1717) to connect to the proposed Northern Loop
- extension of Jolly Road (SR 1120) on the west side of NC 11

A list of recommended subdivision ordinances is included in Appendix D.

Zoning Ordinances

Zoning is probably the single most commonly used legal device available for implementing a community's land-use plan. To paraphrase the U.S. Department of Commerce 1924 Standard Zoning Enabling Act, on which most present-day legislation is based, zoning may be defined as the division of a municipality (or other governmental unit) into districts, and the regulation within these districts of:

1. the height and bulk of buildings and other structures;
2. the area of a lot which may be occupied and the size of required open spaces;
3. the density of population; and
4. the use of buildings and land for trade, industry, residence, or other purposes.

The characteristic feature of the zoning ordinance that distinguishes it from most other regulations is that it differs from district to district, rather than being uniform throughout a city. Thus, a given area might be restricted to single-family residential development with minimum lot size requirements and setback provisions appropriate for development. In other areas, commercial or industrial development might be permitted, and regulations would be enacted to control such development. Building code provisions or sanitary regulations, on the other hand, normally apply to all buildings in a certain category regardless of where they may be situated within a city.

The zoning ordinance does not regulate the design of streets, utility installation, the reservation or dedication of parks, street rights-of-way, school sites, and related matters. These are controlled by subdivision regulations or possibly by use of an official map. The zoning ordinance should, however, be carefully coordinated with these and other control devices.

Future Street Lines

The Future Street Line Ordinance is of particular benefit where the widening of a street will be necessary at some time in the future. A municipality, with legislative approval, may amend its charter to be empowered to adopt future street line ordinances. Through a metes-and-bounds description of a street's future right-of-way requirements, the Town may prohibit new construction or reconstruction of structures within the future right-of-way. This approach requires the specific design of a facility and would usually require surveys and public hearings to allow affected property owners to know what to expect and to make necessary adjustments without undue hardship. A specific ordinance can be enacted for several streets.

Recommended thoroughfare projects where this tool may be applicable include:

- widening of NC 102/3rd Street
- widening of Lee Street (SR 1149)

Recommended right-of-way and street cross sections for these thoroughfares are given in Appendix B.

Official Maps

North Carolina General Statutes 136-44.50 through 133-44.53 are collectively designated as the Roadway Corridor Official Map Act. The adoption of a Roadway Corridor Official Map, or Official Street Map as it is more commonly known, places severe but temporary restrictions on private property rights within a specified corridor. These restrictions are in the form of a prohibition, for a period of up to three years, on the issuance of building permits and the approval of subdivision of property lying within the Official Street Map corridor. This authority should be used carefully and only in cases where less restrictive powers will be ineffective.

The statute establishing the Official Street Map authority is fairly explicit in outlining the procedures to be followed and the types of projects to be considered. As required by the Statute, a project being considered for an Official Street Map must be on an adopted street system plan.

The Program and Policy Branch of the North Carolina Department of Transportation is responsible for facilitating the adoption of Official Street Maps. Cities considering Official Street Map projects should contact this Branch for their "Guidelines for Municipalities Considering Adoption of Roadway Corridor Maps" at:

Program Development Branch
NCDOT
P. O. Box 25201
Raleigh, North Carolina 27611

Urban Renewal

Urban renewal plays a minor role in the transportation planning implementation process in terms of scope and general influence. However, under the right circumstances, renewal programs can make significant contributions. Provisions of the New Housing Act of 1974 (as amended) call for the conservation of good areas, rehabilitation of declining areas, and clearance of slum areas. In the course of renewal, it is important to coordinate with the Thoroughfare Plan to see if additional setbacks or dedication of rights-of-way are needed.

Continued use of urban renewal programs to improve the transportation system is encouraged. Changes that can be made under this program are generally not controversial or disruptive compared to the clearance of a significant area.

Capital Improvements Programs

A Capital Improvements Program, with respect to transportation, is a long-range plan for the spending of money on street improvements, acquisition of rights-of-way and other improvements within the bounds of projected revenues. Municipal funds should be available for construction of street improvements that are a municipal responsibility, right-of-way cost sharing on facilities designated a Division of Highways responsibility, and advance purchase of right-of-way where such action is warranted.

Historically, cities and towns have depended a great deal on Federal or State funding to solve their transportation problems. Chapter 136, Article 3A, of the Road and Highway Laws of North Carolina clearly outlines the responsibilities and obligations of the various governmental bodies regarding highway improvements. North Carolina Highway Bill 1211, passed in 1988, limits the role of municipalities to specific limits in right-of-way cost sharing. Set-back regulations, right-of-way dedications and reservations play a major role in the ultimate cost of many facilities. Only in special cases will the municipality be able to enjoy the benefits of highway improvement without some form of investment.

Development Reviews

Driveway access to a State-maintained street or highway is reviewed by the District Engineer's office and by the Traffic Engineering Branch of the North Carolina Department of Transportation prior to access being allowed. Any development expected to generate large volumes of traffic (e.g., shopping centers, fast food restaurants, or large industries) may be comprehensively studied by staff from the Traffic Engineering, Planning and Environmental, and/or Roadway Design Branches of NCDOT. If done at an early stage, it is often possible to significantly improve the development's accessibility at minimal expense. Since the municipality is the first point of contact for developers, it is important that the municipality advise them of this review requirement and cooperate in the review process.

Other Funding Sources

- (1) Assess user impact fees to fund transportation projects. These fees, called "facility fees" in the legislation, are to be based upon "reasonable and uniform considerations of capital costs to be incurred by the town as a result of new construction. The facility fee must bear a direct relationship to additional or expanded public capital costs of the community service facilities to be rendered for the inhabitants, occupants of the new construction, or those associated with the development process."
- (2) Enact a bond issue to fund street improvements.

- (3) Continue to work with NCDOT to have local projects included in the Transportation Improvement Program (TIP).
- (4) Consider the possibility of specific projects qualifying for federal demonstration project funds.
- (5) Adopt a collector street plan that would assess buyers or property owners for street improvements.
- (6) Charge a special assessment for utilities. For example, increase water and sewer bills to cover the cost of street improvements.
- (7) Lobby for the use of Small Urban and Discretionary Funds, which are funds that the Board of Transportation Member may use at his or her discretion for area road projects.
- (8) Request Industrial Access Funds, which are state funds to construct access roads to large industries.
- (9) Use the municipality's Powell Bill Funds, which can be used for a wide variety of local projects, including roadway construction, maintenance, traffic control, right-of-way acquisition, and bikeways.
- (10) Request federal assistance through the U. S. Department of Housing and Urban Development, including Community Revitalization Block Grants (which can be used to construct local streets), and Economic Development Grants.
- (11) Apply for grants and loans for public works and development facilities from other Federal agencies, e.g., Small Business Development, etc.

APPENDIX A

APPENDIX A

Typical Thoroughfare Cross Sections

Typical thoroughfare cross sections are shown in Figure A-1.

Cross section "A" is typical for controlled access freeways. The 46 foot grassed median is the minimum median width. Wider variations could result depending upon design considerations. Slopes of 8:1 into 3 foot drainage ditches are desirable for traffic safety. Right-of-way requirements would typically vary upward from 250 feet depending upon cut and fill requirements.

Cross section "B" is typical for four lane divided highways in rural areas that may have only partial or no control of access. The minimum median width for this cross section is 30 feet, but a wider median is desirable. Design requirements for slopes and drainage would be similar to cross section "A", but there may be some variation from this depending upon right-of-way constraints.

Cross section "C", seven lane urban, and cross section "D", five lane urban, are typical for major thoroughfares where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

Cross sections "E" and "F" are used on major thoroughfares where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections.

Cross section "G" is recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 24 feet is recommended with 30 feet being desirable.

Typical cross section "H" is recommended for major thoroughfares where projected travel indicates a need for four travel lanes, but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections.

Thoroughfares which are proposed to function as one-way traffic carriers would typically require cross section "I".

Cross sections "J" and "K" are recommended for minor thoroughfares since these facilities usually serve both land service and traffic service functions. Cross section "J" would be used on those minor thoroughfares where parking on both sides is needed as a result of more concentrated development.

Cross section "L" is used in rural areas or for staged construction of a wider multilane cross section. On some thoroughfares, projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time.

The curb and gutter cross sections all illustrate the sidewalk next to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk farther away from the street to provide added separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

Rights-of-way shown for the typical cross sections are the minimum rights-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

If there is sufficient bicycle traffic along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to allow for the bicycle facilities. The North Carolina Bicycle Facility and Program Handbook should be consulted for bicycle facility design standards.

Recommended typical cross sections for thoroughfares were derived using projected traffic, existing capacities, desirable levels of service, and available right-of-way.

TYPICAL THOROUGHFARE CROSS SECTIONS

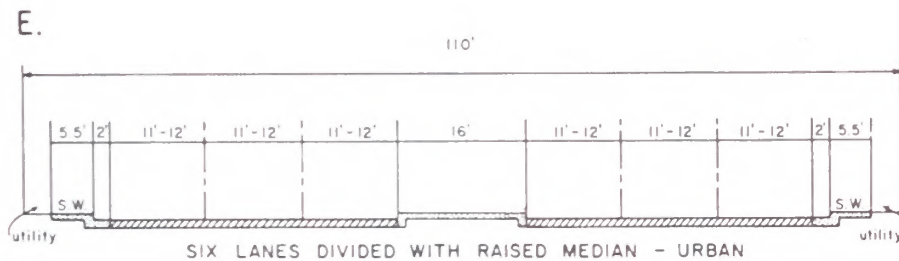
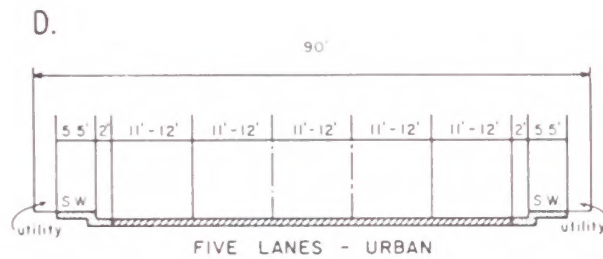
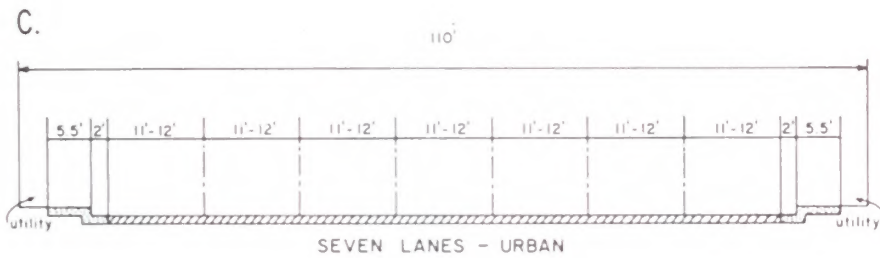
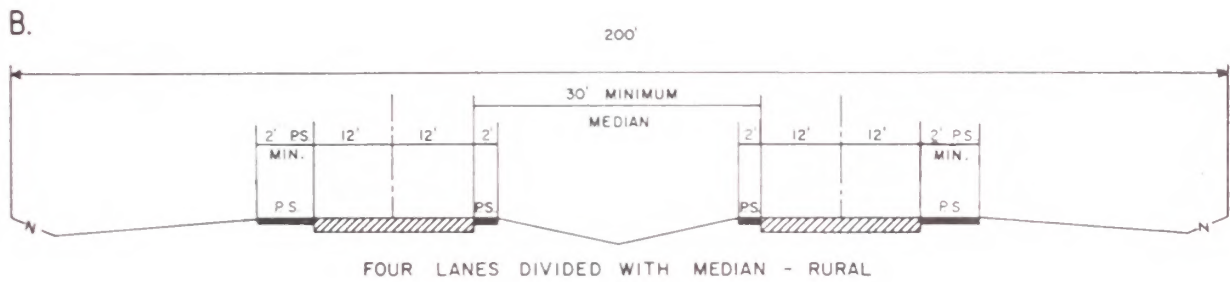
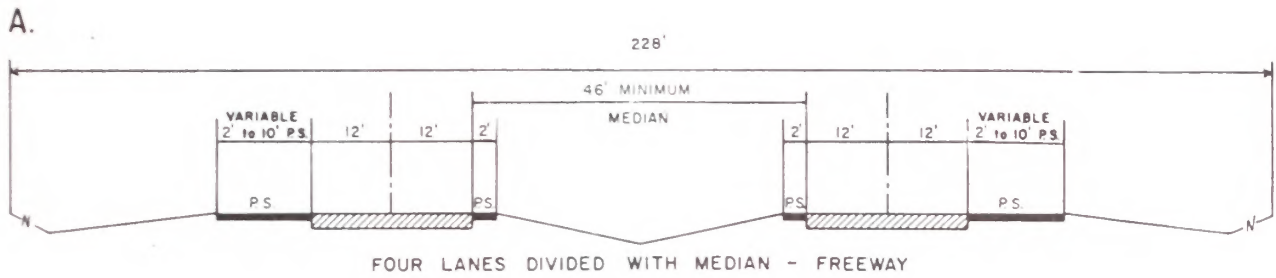
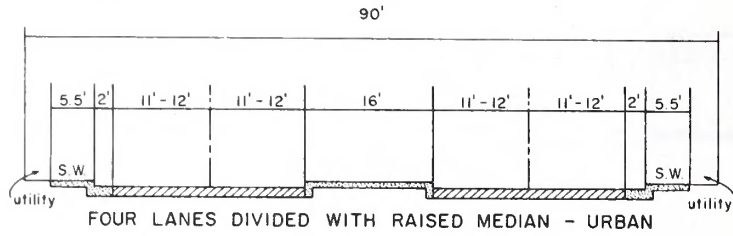


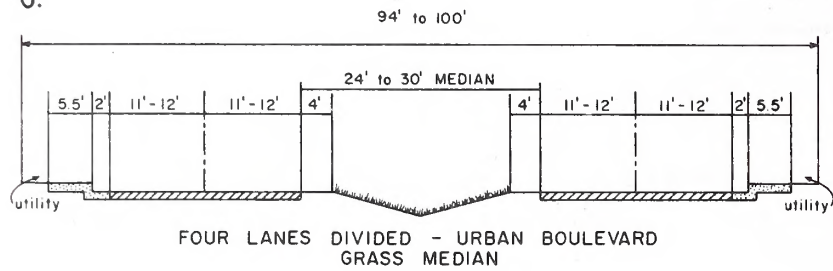
FIGURE A-1

TYPICAL THOROUGHFARE CROSS SECTIONS (CONTINUED)

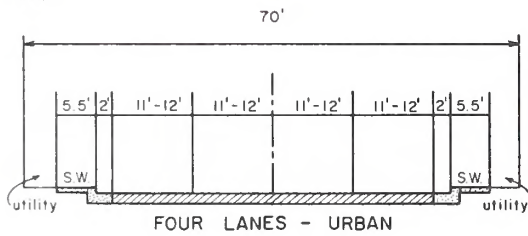
F.



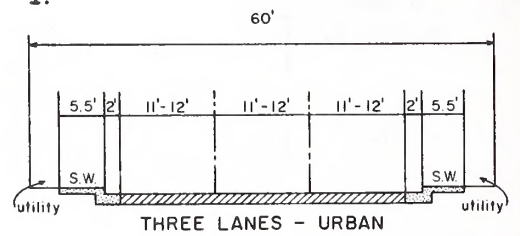
G.



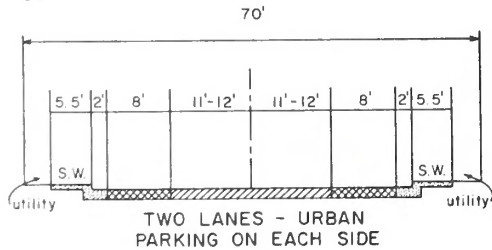
H.



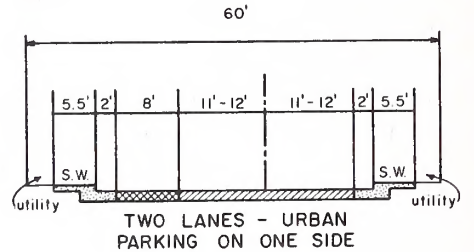
I.



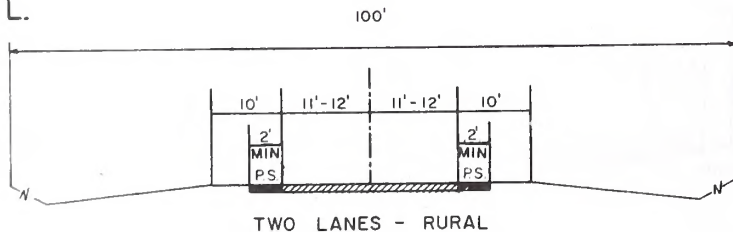
J.



K.



L.



APPENDIX B

APPENDIX B

Street Inventory and Recommendations

The Street Inventory and Recommendations consist of a listing of streets in the Ayden Urban Area, base year and future year traffic volumes, and a recommended cross section for each street.

Key:

2L, 3L, 4L, 5L - 2, 3, 4, or 5 lane undivided roadway
2LP - 2 lane road with parking on one or both sides
4LD, 6LD - 4 or 6 lane divided roadway
A through L - Refers to thoroughfare cross sections, Figure A-1
ADQ - Adequate
ADT - Average Daily Traffic
CODE - Refers to thoroughfare cross section diagram
DIST - Distance along section of roadway
MI - Miles
N/A - Not available
PRACTICAL CAPACITY - Capacity at Level of Service D
RDWY - Roadway
ROW - Right-of-way
SR - Secondary Road
UN - Unpaved road
VPD - Vehicles per day

TABLE B-1
Ayden Street Inventory and
Recommendations

ROADWAY REFERENCE SECTION

ROADWAY REFERENCE SECTION	EXISTING SYSTEM						RECOMMENDED PLAN			
	CROSS SECTION		PRACTICAL CAPACITY (VPD)	AVERAGE DAILY TRAFFIC		RDWY (CODE/LANES)	CROSS SECTION		ADT 2015 (VPD)	
	DIST (MI)	RDWY (FT/LANES)		ROW (FT)	1990 (VPD)		2005 (VPD)	2015 (VPD)		RDWY (FT/LANES)

NC 11

Swift Creek - NC 102	2.00	48 / 4LD	240	30,000	6,600	10,000	14,000	ADQ	ADQ	ADQ	12,000
NC 102 - WCL Ayden	0.38	48 / 4LD	200	30,000	5,800	9,000	12,000	ADQ	ADQ	ADQ	12,000
WCL Ayden - SR 1109	1.55	48 / 4LD	200	35,000	9,500	15,000	19,500	ADQ	ADQ	ADQ	17,500
SR 1109 - SR 1110	2.42	48 / 4LD	170	35,000	N/A	---	---	ADQ	ADQ	ADQ	---

NC 102, 3rd St

SR 1112 - NC 11	1.60	20 / 2L	60	9,000	3,300	3,800	4,600	L / 2L	ADQ	ADQ	4,600
NC 11 - SR 1120	0.10	44 / 3L	60	12,000	9,300	13,500	17,500	D / 5L	100	22,000	13,500
SR 1120 - Verna Street	0.38	44 / 3L	60	15,000	N/A	---	---	D / 5L	100	22,000	---
Verna St. - Washington Street	0.21	30 / 2L	60	12,000	N/A	---	---	L / 2L	ADQ	ADQ	---
Washington St - Snowhill St	0.07	40 / 3L	60	12,000	N/A	---	---	D / 5L	100	22,000	---
Snowhill St - Park Ave	0.04	27 / 2L	60	12,000	N/A	---	---	D / 5L	100	22,000	---
Park Ave - Venters St	0.10	42 / 2LP	60	11,000	8,500	10,500	12,500	D / 5L	100	22,000	10,500
Venters St - SR 1149	0.14	50 / 2LP	60	11,000	6,700	9,000	11,000	D / 5L	100	22,000	9,500
SR 1149 - SR 1900	0.09	42 / 2LP	N/A	11,000	5,100	7,000	8,400	*I / 3L	60	15,000	6,600
SR 1900 - 0.14 mi east 0.14 mi east of SR 1900	0.14	45 / 2LP	60	12,000	5,700	7,600	9,300	*I / 3L	ADQ	15,000	7,200
- ECL Ayden	0.27	30 / 2L	60	12,000	3,200	5,400	7,600	I / 3L	ADQ	15,000	7,400
ECL Ayden - SR 1723	1.30	20 / 2L	100	9,000	3,400	4,900	6,300	L / 2L	ADQ	11,000	6,300

* = No construction necessary

Ayden Northern Loop

NC 11 - SR 1149	*	*	*	*	*	*	*	L / 2L	100	11,000	4,500
SR 1149 - SR 1122	*	*	*	*	*	*	*	L / 2L	100	11,000	2,500
SR 1122 - NC 102	*	*	*	*	*	*	*	L / 2L	100	11,000	2,200

Ayden Southern Loop

NC 11 - SR 1900	*	*	*	*	*	*	*	L / 2L	100	11,000	2,400
SR 1900 - NC 102	*	*	*	*	*	*	*	L / 2L	100	11,000	2,000

TABLE B-1
Ayden Street Inventory and
Recommendations

ROADWAY REFERENCE SECTION	EXISTING SYSTEM						RECOMMENDED PLAN				
	CROSS SECTION		PRACTICAL CAPACITY (VPD)	AVERAGE DAILY TRAFFIC		ADT 2015 (VPD)	RDWY (CODE/LANES)	ROW (FT)	CAPACITY (VPD)	ADT 2015 (VPD)	
DIST (MI)	RDWY (FT/LANES)	ROW (FT)	1990 (VPD)	2005 (VPD)	2015 (VPD)						
SR 1900, East RR Ave/ Weyerhaeuser Rd											
NC 102 - SCL Ayden	0.61	18 / 2L	N/A	8,000	2,000	2,700	3,300	L / 2L	60	11,000	3,300
SCL Ayden - SR 1902	1.10	18 / 2L	N/A	8,000	1,600	2,200	2,700	L / 2L	60	11,000	2,700
SR 1902 - SR 1108	1.35	18 / 2L	60	8,000	700	1,000	1,300	L / 2L	ADQ	11,000	1,300
SR 1901, Thad Little Rd											
SR 1149 - SR 1900	0.92	20 / 2L	60	9,000	300	600	800	ADQ	ADQ	ADQ	---
SR 1902, Gum Swamp Rd											
SR 1900 - EPB	1.00	22 / 2L	N/A	10,000	500	800	1,000	ADQ	ADQ	ADQ	---
SR 1905, Bill Jones Rd											
SR 1900 - SR 1907	1.40	30 / UN	N/A	2,000	N/A	---	---	PAVE	60	10,000	---
SR 1906, Garris Rd											
SR 1900 - SR 1108	0.90	36 / UN	N/A	2,000	N/A	---	---	PAVE	60	10,000	---
Juanita Dr and Ext											
SR 1149 - Sunset Dr	0.42	18 / 2L	N/A	8,000	N/A	---	---	L / 2L	60	11,000	---
Sunset Dr - 0.08 mi W (curve)	0.08	30 / 2L	N/A	12,000	N/A	---	---	ADQ	ADQ	ADQ	---
Curve - Belvedere Ct	0.11	28 / 2L	N/A	12,000	N/A	---	---	ADQ	ADQ	ADQ	---
Belvedere Ct - 2nd St	0.11	18 / 2L	N/A	8,000	N/A	---	---	L / 2L	60	11,000	---
2nd St - 3rd St	0.11	20 / 2L	N/A	9,000	N/A	---	---	L / 2L	60	11,000	---
NC 102 - Snowhill St	0.47	18 / 2L	N/A	8,000	N/A	---	---	L / 2L	60	11,000	---
Snowhill St - SR 1149	*	*	*	proposed	*	*	*	L / 2L	60	11,000	1,800
SR 1149 - SR 1900	*	*	*	proposed	*	*	*	L / 2L	60	11,000	1,000
SR 1900 - Ayden Southern Loop	*	*	*	proposed	*	*	*	L / 2L	60	11,000	1,000
College St and Ext											
NC 102 - SR 1172	0.61	20 / 2L	N/A	9,000	N/A	---	---	ADQ	ADQ	ADQ	---
SR 1122 - Ayden Northern Loop	*	*	*	proposed	*	*	*	L / 2L	60	11,000	800

APPENDIX C





GREENVILLE

THOROUGHFARE PLAN

MAY 10, 1990



ADOPTED BY CITY OF GREENVILLE
 MAY 10, 1990.
 RECOMMENDED APPROVED BY PLANNING
 AND RESEARCH BRANCH MAY 15, 1990
 ADOPTED BY NORTH CAROLINA DEPARTMENT OF
 TRANSPORTATION JUNE 1, 1990

PUBLIC MEETINGS	PUBLIC HEARINGS
6-1-89	7-1-89
6-15-89	8-1-89
6-29-89	8-15-89
7-13-89	8-29-89
7-27-89	9-12-89
8-10-89	9-26-89

LEGEND

EXISTING	PROPOSED
MAJOR THOROUGHFARES	
FREEWAYS	
OTHER	
MINOR THOROUGHFARES	
INTERCHANGE	
GRADE SEPARATION	

Scale: 1" = 1/4" (1/4 mile)



LEGEND	
EXISTING	PROPOSED
MAJOR THOROUGHFARE	—
MINOR THOROUGHFARE	—
INTERCHANGES	●

FIGURE C-2

ADOPTED BY:
TOWN OF WINTERVILLE, MAY 11, 1992

RECOMMENDED FOR APPROVAL BY: *plc*
STATEWIDE PLANNING BRANCH, MAY 19, 1992

ADOPTED BY:
DEPT. OF TRANSPORTATION, JULY 10, 1992

PUBLIC MEETING: MAY 11, 1992

PUBLIC HEARING: MAY 11, 1992

MAY 11, 1992

**THOROUGHFARE PLAN
WINTERVILLE**
PITT COUNTY
NORTH CAROLINA

PREPARED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS, PLANNING AND ENVIRONMENTAL BRANCH

IN COOPERATION WITH
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

800 1600 2400 3200



SCALE: 1" = 1600'

APPENDIX D



APPENDIX D

Recommended Subdivision Ordinances Controlling Roadway Design

Definitions

I. Streets and Roads:

A. Rural Roads

1. **Principal Arterial** - A rural link in a highway system serving travel, and having characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.
2. **Minor Arterial** - A rural roadway joining cities and larger towns and providing intrastate and inter-county service at relatively high overall travel speeds with minimum interference to through movement.
3. **Major Collector** - A road which serves major intra-county travel corridors and traffic generators and provides access to the Arterial system.
4. **Minor Collector** - A road which provides service to small local communities and traffic generators and provides access to the Major Collector system.
5. **Local Road** - A road which serves primarily to provide access to adjacent land, over relatively short distances.

B. Urban Streets

1. **Major Thoroughfares** - Major thoroughfares consist of Interstate and other freeway, expressway, or parkway roads, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.
2. **Minor Thoroughfares** - Minor thoroughfares collect traffic from local access streets and carry it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating minor through-traffic movements and may also serve abutting property.
3. **Local Street** - A local street is any street not on a higher order urban system and serves primarily to provide direct access to abutting land.

C. Specific Types of Rural or Urban Streets

1. **Freeway, expressway, or parkway** - Divided multilane roadways designed to carry large volumes of traffic at high speeds. A freeway provides for continuous flow of vehicles to selected crossroads only by way of interchanges. An expressway is a facility with full or partial control of access and generally with grade separations at major intersections. A parkway is for non-commercial traffic, with full or partial control of access.
2. **Residential Collector Street** - A local street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.
3. **Local Residential Street** - Cul-de-sacs, loop streets less than 2,500 feet in length, or streets less than one mile in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.
4. **Cul-de-sac** - A short street having only one end open to traffic and the other end being permanently terminated and a vehicular turn-around provided.
5. **Frontage Road** - A road that is parallel to a partial or full access controlled facility and provides access to adjacent land.
6. **Alley** - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property

- A. **Building Setback Line** - A line parallel to the street in front of which no structure shall be erected.
- B. **Easement** - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.
- C. **Lot** - A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

III. Subdivision

- A. **Subdivider** - Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.
- B. **Subdivision** - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, immediate or future, of sale or building development and all divisions of land involving the dedication of a new street or change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than ten acres where no street right-of-way dedication is involved; (3) widening of open streets; (4) the division of a tract in single ownership whose entire area is no greater than two acres into not more than three lots, where no street right of way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.
- C. **Dedication** - A gift, by the owner, of his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.
- D. **Reservation** - Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

DESIGN STANDARDS

I. Streets and Roads

The design of all roads within the Town of Ayden shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHTO) manuals.

The provision of street rights-of-way shall conform and meet the recommendations of the Thoroughfare Plan as adopted by the Town of Ayden and the North Carolina Department of Transportation.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

The urban planning area shall consist of that area within the urban planning boundary as depicted on the mutually adopted Brevard Thoroughfare Plan. The rural planning area shall be that area outside the urban planning boundary.

A. **Right-of-way Widths** - Right-of-way (ROW) widths shall not be less than the following and shall apply except in those cases where ROW requirements have been specifically set out in the Thoroughfare Plan.

1. Rural	Minimum ROW
a. Principle Arterial	
Freeways	350 ft.
Other	200 ft.
b. Minor Arterial	100 ft.
c. Major Collector	100 ft.
d. Minor Collector	80 ft.
e. Local Road	* 60 ft.
2. Urban	
a. Major Thoroughfare other than Freeway and Expressway	90 ft.
b. Minor Thoroughfare	70 ft.
c. Local Street	* 60 ft.
d. Cul-de-sac	** Variable

The subdivider will only be required to dedicate a maximum of 100 feet of right-of-way. In cases where over 100 feet of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 100 feet. On all cases in which right-of-way is sought for a fully controlled access facility, the subdivider will only be required to make a reservation. It is strongly recommended that subdivisions provide access to properties from

* The desirable minimum right-of-way (ROW) is 60 ft. If curb and gutter is provided, 50 feet of ROW is adequate on local residential streets.

** The ROW dimension will depend on radius used for vehicular turn-around. Distance from edge of pavement of turn-around to ROW should not be less than distance from edge of pavement to ROW on street approaching turn-around.

internal streets, and that direct property access to major thoroughfares, principle and minor arterials, and major collectors be avoided. Direct property access to minor thoroughfares is also undesirable.

A partial width right-of-way, not less than sixty feet in width may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is subdivided, the remainder of the full required right-of-way shall be dedicated.

B. **Street Widths** - Width for street and road classifications other than local shall be as required by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

1. Local Residential -

Curb and Gutter section: 26 feet, face to face of curb
Shoulder section: 20 feet to edge of pavement, 4 foot
shoulders

2. Residential Collector -

Curb and Gutter section: 34 feet, face to face of curb
Shoulder section: 20 feet to edge of pavement, 6 foot
shoulders

C. **Geometric Characteristics** - The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.

1. **Design Speed** - The design speed for a roadway should be a minimum of 5 mph greater than the posted speed limit. The design speeds for subdivision type streets shall be:

TABLE D-1

DESIGN SPEEDS

Facility Type	Desirable Speed	----- Minimum Speed -----		
		Level	Rolling	Mountainous
Rural				
Minor Collector Roads	60	50	40	30
Local roads, including Residential Collectors and Local Residential	50	* 50	* 40	* 30
Urban				
Major Thoroughfares, other than Freeway, Expressway, or Parkway	60	50	50	50
Minor Thoroughfares	60	50	40	40
Local Streets	40	** 40	** 30	** 30

* Based on projected annual average daily traffic of 400-750. In cases where road will serve a limited area and small number of dwelling units, minimum design speeds can be reduced further.

** Based on projected annual average daily traffic of 50-250.

2. **Maximum and Minimum Grades**

a. The maximum grades in percent shall be:

TABLE D-2			
MAXIMUM VERTICAL GRADE			
Design Speed	----- Terrain -----		
	Level	Rolling	Mountainous
60	4	5	6
50	5	6	7
40	6	7	8
30		9	10
20			12

- b. A minimum grade for curbed streets should not be less than 0.5%.
- c. Grades for 100 feet each way from intersections (measured from edge of pavement) should not exceed 5 percent.
- d. For streets and roads with projected annual average daily traffic less than 250, short grades less than 500 feet long may be 50% greater than the value in the above table.

3. **Minimum Sight Distance** - In the interest of public safety, no less than the minimum sight distance applicable shall be provided. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters:

TABLE D-3				
SIGHT DISTANCE				
Design Speed, MPH	30	40	50	60
Stopping Sight Distance:				
Minimum (ft.)	200	275	400	525
Desirable Minimum (ft.)	200	325	475	650
Minimum K* Value for:				
Crest Curve	30	80	160	310
Sag Curve	40	70	110	160
Passing Sight Distance:				
Minimum Passing Distance for 2 lanes, in feet	1,035	1,460	1,915	2,380

(General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case.)

Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1984."

* K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve which will provide the desired sight distance.

4. The "Superelevation Table" below shows the maximum degree of curve and related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter is 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

TABLE D-4			
SUPERELEVATION TABLE			
Design Speed	Maximum e*	Minimum Radius ft.	Max. Deg. of Curve
30	0.04	302	19 00'
40	0.04	573	10 00'
50	0.04	955	6 00'
60	0.04	1,528	3 45'
30	0.06	273	21 00'
40	0.06	509	11 15'
50	0.06	849	6 45'
60	0.06	1,380	4 15'
30	0.08	252	22 45'
40	0.08	468	12 15'
50	0.08	764	7 30'
60	0.08	1,206	4 45'

* e = rate of roadway superelevation, foot per foot

D. Intersections

1. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty-five (65) degrees.
2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.
3. Offset intersections are to be avoided. Intersections which cannot be aligned should be separated by a minimum length of 200 feet between survey centerlines.

E. Cul-de-sacs

Cul-de-sacs shall not be more than seven hundred (700) feet in length. The distance from the edge of pavement on the vehicular turn-around to the right-of-way line should not be less than the distance from the edge of pavement to right-of-way line on the street approaching the turn-around. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

F. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provision is made for service access. Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.
2. The width of an alley shall be at least twenty (20) feet.
3. Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn-around facilities at the dead-end as may be required by the Planning Board.

G. Permits For Connection To State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. The application is available at the office of the District Engineer of the Division of Highways.

H. Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet from the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 6 feet from the face of curb.

I. Wheelchair Ramps

All street curbs being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason, shall provide wheelchair ramps for the physically handicapped at intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

Wheelchair ramps and depressed curbs shall be constructed in accordance with details contained in the Department of Transportation, Division of Highways, publication entitled, "Guidelines, Curb Cuts and Ramps for Handicapped Persons."

J. Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:
 - a. Shoulder section approach
 - i. Under 800 ADT design year: Minimum 28 feet width face to face of parapets of rails or pavement width plus 10 feet, whichever is greater.
 - ii. 800 - 2000 ADT design year: Minimum 34 feet width face to face of parapets of rails or pavement width plus 12 feet, whichever is greater.
 - iii. Over 2000 ADT design year: Minimum width of 40 feet, desirable width of 44 feet width face to face of parapets of rails.
 - b. Curb and gutter approach
 - i. Under 800 ADT design year: Minimum 24 feet face to face of curbs.
 - ii. Over 800 ADT design year: Width of approach pavement measured face to face of curbs.

Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be 1'6" minimum, or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:
 - a. Shoulder section approach - Width of approach pavement plus width of usable shoulders on the approach left and right. (Shoulder width 8' minimum, 10' desirable.)
 - b. Curb and gutter approach - Width of approach pavement measured face to face of curbs.

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